

Expanded Site
Inspection Report

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AMCA International Corp.
(a.k.a. Continental-Midland, Inc.)
Park Forest, Illinois

U.S. Environmental Protection Agency
ILD 051 069 854

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1.0 Introduction

On May 21, 1992, Black & Veatch Waste Science, Inc. was authorized by the U.S. Environmental Protection Agency (USEPA) Region V to conduct an expanded site inspection (ESI) of the AMCA International Corporation (AMCA) site in Park Forest, Will County, Illinois. The site is also referred to as Continental-Midland, Inc.

The site initially was placed on the Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) on February 1, 1984, as a result of a request for discovery action initiated by the Illinois Environmental Protection Agency (IEPA).

The facility received its initial Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) evaluation in the form of a preliminary assessment (PA) report completed by Bonnie Eleder, IEPA, on March 15, 1984. The sampling portion of the ESI was conducted from August 30, 1993, to September 2, 1993, when a field team collected four sediment samples, five groundwater samples from neighboring residential wells, and three groundwater samples from newly installed onsite monitoring wells.

The purposes of the ESI have been stated by USEPA in a directive outlining site inspections performed under CERCLA. The directive states:

The objective of the expanded site inspection (SI) is to provide documentation for the Hazard Ranking System (HRS) package to support National Priorities List (NPL) rulemaking. Remaining HRS information requirements are addressed and site hypotheses not completely supported during previous investigations are evaluated. Expanded SI sampling is designed to satisfy HRS data requirements by documenting observed releases, observed contamination, and levels of actual contamination at targets. In addition, investigators collect remaining non-sampling information. Sampling during the expanded SI includes background and quality assurance/quality control samples to fully document releases and attribute them to the site. Following the expanded SI, USEPA site assessment managers assign the site a priority for HRS package preparation and proposal to the NPL.

USEPA Region V requested that the ARCS V contractor identify sites during the ESI that may require removal action to remediate an immediate human health or environmental threat.

2.0 Site Background

2.1 Introduction

This section includes information obtained from the ESI and previous site activity reports.

2.2 Site Description

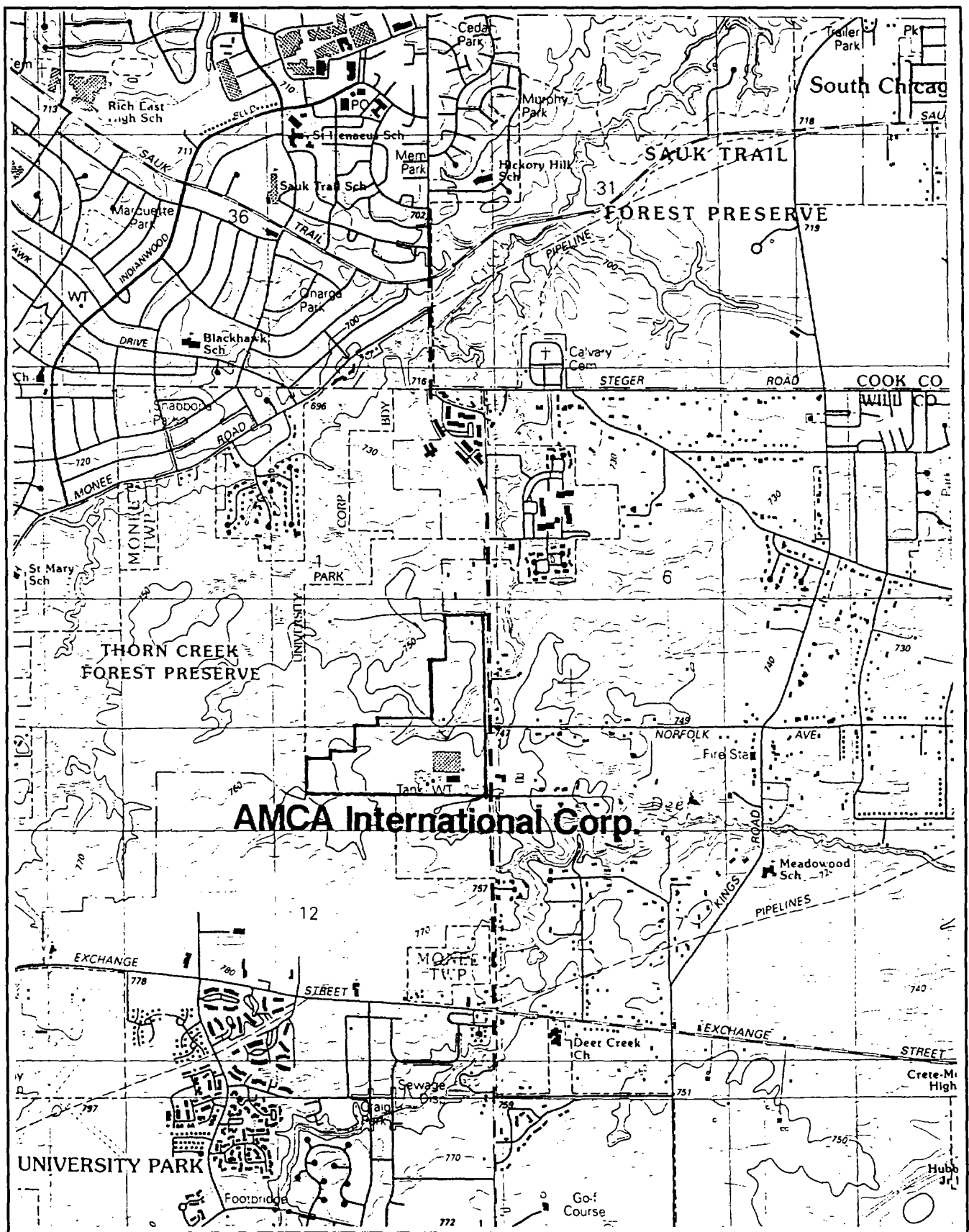
AMCA is located in a rural/suburban setting at 25000 South Western Avenue, Park Forest, Will County, Illinois. The site occupies about 85 acres in Sections 11 and 12 of Township 34 North, Range 13 East. Scattered residences and residential subdivisions are located within one mile of the site. Figure 2-1 is a site location map. Figure 2-2 is a site sketch.

Several buildings and a parking lot occupy about 12 acres of the site. The buildings are surrounded by a fence. Manufacturing activities take place inside the fence. The remaining 73 acres of the site are heavily wooded and unfenced. The Thorn Creek Forest Preserve is adjacent to the northern and western site boundaries. To the south and east are residential neighborhoods with some commercial and light industry settings. A parking lot entrance, located near the southeastern corner of the site, allows entry from Western Avenue. A unmanned guard shack is located at the entrance of the fenced area. A dirt road, located onsite north of the manufacturing buildings, leads west from Western Avenue to an abandoned dilapidated residence. A concrete foundation slab is located approximately 100 yards west of the manufacturing area. At one time, the facility operated an Imhoff tank and sludge drying beds; the inactive system is located near the western property line.

The site topography is generally flat; however, a marsh exists onsite just north of the manufacturing buildings. Site runoff flows northward from the paved area of the parking lot and around the buildings into the marsh. AMCA has a National Pollutant Discharge Elimination System permit that allows site runoff to flow into the eastern edge of the marsh. The marsh drains northward into an unnamed creek, which empties into Thorn Creek. Thorn Creek eventually flows into the Little Calumet River. Appendix A contains the 15-mile downstream surface water pathway.

2.3 Site History

This section presents information pertaining to the operational history of the site and the history of onsite environmental work.



Source: USGS Topographic Map, Steger Quadrangle

Not to scale



Figure 2-1
Site Location Map

AMCA International
(a.k.a. Continental Midland, Inc.)

2.3.1 Operational History

AMCA is an active facility that manufactures power-actuated tools, gas and electric chain saws, fasteners, and cement finishing equipment. The plant buildings and approximately twelve acres in the southeastern part of the site are leased from the site owner, United Dominion Corporation, formerly AMCA International. All manufacturing processes now take place on these 12 acres.

Mall Tool Company began operations in 1946 or 1947. Remington Arms purchased the property in 1959 and continued operations until 1969, when DESA Industries bought the property. In 1975, AMCA International purchased DESA Industries. In the mid-1980s, the name, DESA Industries, was changed to Continental-Midland, Inc.

Today, facility operations are similar to those conducted by the Mall Tool Company; however, some processes have been simplified and others have been eliminated or sold.

Continental-Midland, Inc., stored solid waste in dumpsters and drummed waste oil in a quonset hut. Drum storage areas are located southwest and west of the main manufacturing building. Two burn areas are west of the main building. Sludge drying beds for Imhoff tank discharges are near the northwestern site corner.

2.3.2 Summary of Onsite Environmental Work

The IEPA sampled surface and subsurface soils in 1983 after receiving an anonymous complaint alleging illegal dumping of hazardous wastes. Polychlorinated biphenyls (PCBs) were detected at levels up to 2,600 parts per million. The IEPA requested that PCB-contaminated soils be remediated. However, a site owner representative stated that cleanup never occurred because the samples found to contain PCBs were random, the result of machine shop spills, not past site disposal operations.

In 1986, DESA Industries hired Environmental Resources Management (ERM), to conduct a remedial investigation. Surface soil samples were collected in potentially contaminated areas. Analytical results indicated the presence of inorganic, PCB, and volatile organic contaminants. Analysis of surface water and sediment samples indicated low levels of contaminants. Groundwater samples were collected from five onsite monitoring wells installed in the glacial drift. Analytical results indicated the presence of PCBs in only one well during one sampling event.

In June 1990, Ecology and Environment, Inc., (E&E) conducted a screening site inspection (SSI) and sampled soil from seven onsite borings. The soil sample analysis indicated the presence of volatile and semi-volatile organic compounds, pesticides, PCBs, and several inorganic analytes. Groundwater samples from the monitoring wells indicated the presence of semi-volatile organic compounds and inorganic analytes. The SSI results indicated that soils, sediments, surface water, and groundwater are areas of concern. Contaminated soils resulted from waste storage and disposal practices. Contaminants in surface water runoff flow into the manmade ditch northwest of the main manufacturing building and then into the marsh. The unnamed stream drains the marsh.

The IEPA instructed DESA Industries to clean up PCBs at the site to zero parts per million, but DESA refused. The matter was passed to the Illinois Attorney General's office; it is unresolved at this point.

2.4 Applicability of Other Statutes

The IEPA assigned AMCA a high priority after the preliminary assessment. The May 23, 1991, SSI report assigned the site a high priority for further investigation (E&E 1991).

AMCA was listed in the Resource Conservation and Recovery Information System (RCRIS) and CERCLIS databases. In the July 24, 1992, RCRIS, the site is listed as DESA Industries, a non-permitted, small quantity generator.

Information collected during the September 24, 1992, ESI site reconnaissance visit indicated the IEPA sued AMCA under the Toxic Substances Control Act.

3.0 Site Inspection Activities and Analytical Results

3.1 Introduction

This section outlines procedures used and observations made during the ESI conducted at the AMCA site. Sampling activities were conducted in accordance with the September 27, 1991, Quality Assurance Project Plan (QAPP). Figure 3-1 shows the sample locations; Table 3-1 summarizes sample descriptions and locations.

ESI samples were analyzed by USEPA Contract Laboratory Program (CLP) participant laboratories for organic and inorganic substances contained on the USEPA Target Compound List (TCL) and Target Analyte List (TAL). Appendix B presents the TCL and TAL. Appendix C presents ESI sampling analytical data. Appendix D contains photographs of the site and sample locations. Appendix E contains the boring and well installation logs from the subsurface investigation.

3.2 Site Reconnaissance

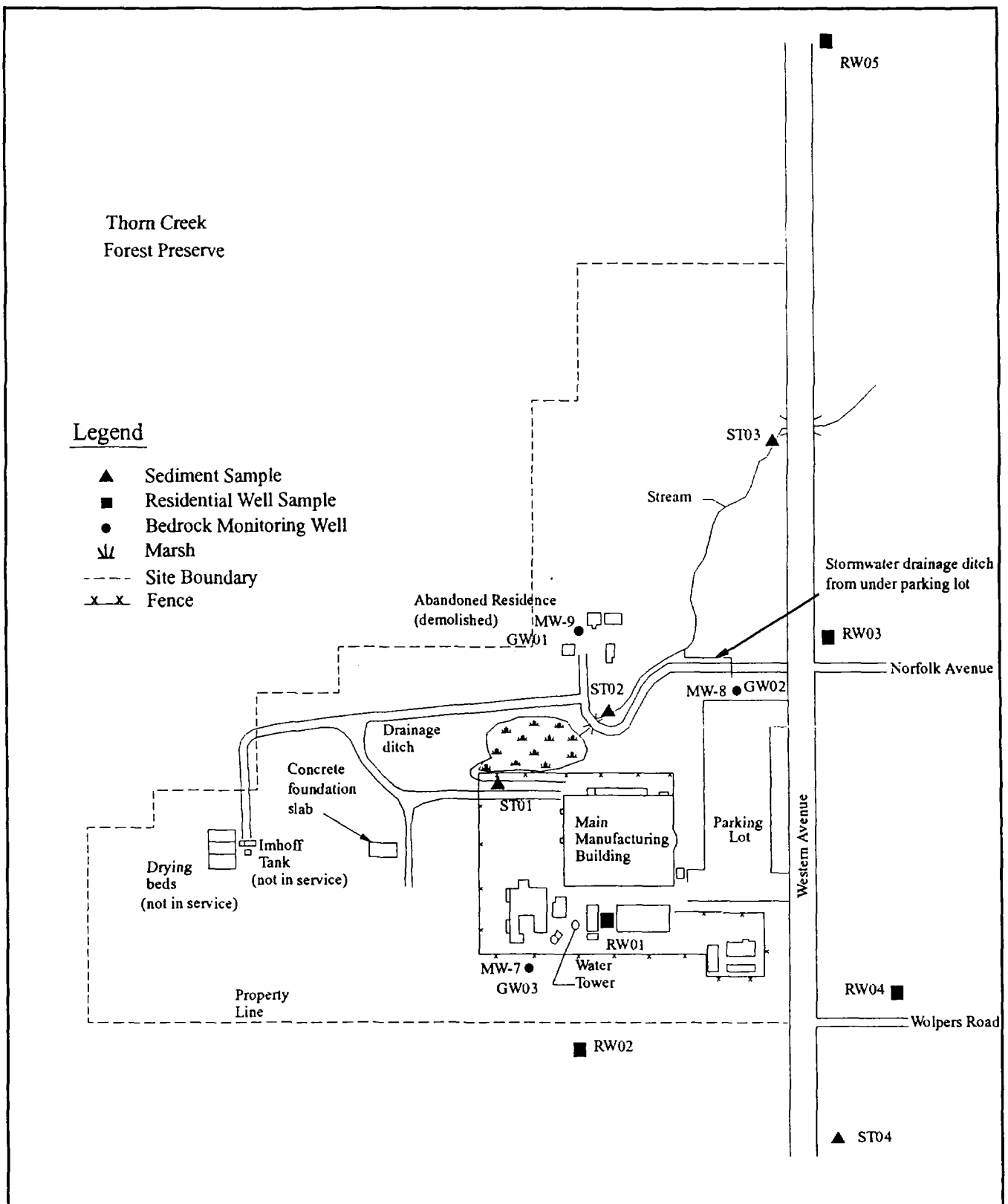
On September 24, 1992, the ARCS V contractor conducted a reconnaissance of the AMCA site. The visit included a visual site inspection to determine the site's status, facility activities, health or safety hazards, and potential sampling locations.

The reconnaissance began with a discussion of the purpose of the visit with the site owner representatives. A site tour was conducted and the existing well locations and site layout were noted. Potential well and sampling locations were identified; hospital and emergency contacts were obtained. The weather was clear, about 60F, with winds out of the south at 5 to 15 miles-per-hour.

3.3 Site Representative Interview

The site reconnaissance began with an interview with AMCA representatives, including Mr. Joseph Wirtes, Director of Assembly Operations, representing the site operator, Continental-Midland, Inc.; Mr. Thomas Hoban, attorney, representing the site owner, DESA Industries; and Ms. Joyce Linck, Delta Environmental, the environmental consultant for DESA.

Continental-Midland operates a powder actuated tool manufacturing plant onsite. The plant buildings and about twelve acres are leased by Continental-Midland from site owner, United Dominion Corporation, formerly AMCA International. Onsite operations began in 1946 or 1947 by the Mall Tool Company. Remington Arms purchased the property and continued operations until 1969, when DESA



Source: ERM Remedial Investigation, 1986

Not to Scale



Figure 3-1
Sample Locations
AMCA International
(A.K.A. Continental Midland, Inc.)

Table 3-1 Sample Descriptions			
Sample	Depth (ft.)	Appearance	Location
GW01	124-134'	Clear	MW-9, north of manufacturing area near abandoned residence.
GW02	120-130'	Clear	MW-8, northeast of main manufacturing building and just north of parking lot on Western Avenue.
GW03	126-136'	Clear	MW-7, southwest of manufacturing area, just beyond fence.
RW01	exact depth unknown	Clear	Onsite drinking water well.
RW02	280'	Clear	Residential well located approximately 900 feet directly south of the property.
RW03	450'	Clear	Residential well located approximately 300 feet east of the property.
RW04	460'	Clear	Residential well located approximately 900 feet east of the property.
RW05	exact depth unknown	Clear	Residential well located approximately 1,200 feet northeast of the property.
ST01	0-6"	Light brown, gritty	In ditch draining parking lot west of facility buildings and inside fence.
ST02	0-6"	Brown with plant material	In bed of stream exiting wetland north of site and north of parking lot.
ST03	0-6"	Dark brown, clayey, with plant material	1,000 feet north of site in bed of stream exiting site, west of Western Avenue.
ST04	0-6"	Dark brown, gritty, with plant material	In bed of stream exiting site, 300 feet south of site, on eastern side of Western Avenue.

Industries purchased the property. In 1975, AMCA International purchased DESA Industries. In the mid-1980s, DESA Industries changed its name to Continental-Midland, Inc.

The site is located at 25000 South Western Avenue, Park Forest, Illinois. The site occupies 85 acres in a rural/residential area. Scattered residences and residential subdivisions are located within one mile of the site. A forest preserve is adjacent to the northwestern site border. Site topography is flat in most areas. North of the facility buildings is a low-lying marshy area and an unnamed creek that drains northward into Thorn Creek.

Access to the property is gained from Western Avenue. A parking lot entrance is near the southeastern site corner. A guard shack at the entrance was not manned during the reconnaissance. The twelve acres that comprise the manufacturing buildings and parking lot are surrounded by a chainlink fence. All manufacturing activities have occurred inside the fenced area. A dirt road from Western Avenue enters the property north of the manufacturing buildings and leads to an abandoned dilapidated residence. The plant manager placed a large tree across it to prevent vehicular access by trespassers. Apparently trespassers also enter the property, sometimes unknowingly, from the forest preserve.

The plant operates two bedrock wells onsite, including a drinking well and a well for fire protection.

IEPA sampled surface and subsurface soils in 1983 after receiving an anonymous complaint alleging illegal dumping of hazardous wastes. PCBs were detected at levels up to 2,600 parts per million. IEPA requested the PCB-contaminated soils be remediated. The site representative stated the areas of PCB-contaminated soil were random due to machine shop spills; therefore, the site owner did not submit to the cleanup request.

DESA Industries hired ERM to conduct a remedial investigation in 1986. Analysis of shallow soil samples collected on a grid in potentially contaminated areas did not indicate the presence of inorganic analytes or PCBs. Surface water sample analysis indicated low levels of hazardous substances. Five onsite shallow glacial drift monitoring wells were installed and sampled; however, the analysis indicated PCBs were present in one monitoring well during one sampling event. Table 1.5 from the remedial investigation report listed manufacturing processes and associated possible contaminants, several of which are CERCLA-regulated substances (40 CFR 302.4).

3.4 Monitoring Well Installation

Three bedrock monitoring wells were installed onsite during ESI field activities. Figure 3-1 shows the monitoring well locations. Soil boring advancement, rock drilling and coring, and monitoring well installations were performed by a three man drilling crew from Fox Drilling Company using a Central Mining Equipment 75 drill rig.

Drilling began on August 8, 1993. A 10-1/4 inch outside diameter (OD) hollow stem auger was used to advance a soil boring at each location. Split spoon soil samples were collected every five feet, starting at five feet below grade, until bedrock was encountered. A geologist classified and logged the soil. Appendix E contains the boring and well installation logs.

Temporary 8-inch nominal diameter flush-threaded steel casing was installed to approximately fifty feet in each borehole. The steel casing was used to prevent contaminant migration from potentially contaminated shallow glacial till water-bearing units to the bedrock aquifer. The steel casing was set within a low-permeability unit such as clay or silt. Drilling continued using a 7-7/8 inch rotary bit, with potable water as a drilling fluid, until circulation loss deterred borehole advancement. The drilling fluid was altered with bentonite powder to increase its viscosity and to prevent the loss of drilling fluid. Rotary drilling continued until bedrock was encountered.

Permanent casing was set in each boring from the surface to bedrock with 4-inch inside diameter (ID) schedule 80 polyvinyl chloride (PVC) casing. The casing was set one foot into the bedrock and grouted into place to isolate the glacial till overburden from the bedrock. The overburden was sealed from the deeper bedrock because past sampling data collected from the shallow monitoring wells indicated the presence of organic compounds. After the casing was set into the bedrock, the boring was continued with 2 inch ID double core barrel, using potable water as a drilling fluid. Each boring was advanced a sufficient depth into the bedrock to assure a representative groundwater sample from the aquifer. The borehole was reamed with a 3-7/8 inch OD tricone bit, using potable water as a drilling fluid.

A monitoring well was installed in each boring using a ten foot, two-inch ID National Sanitation Foundation (NSF) certified schedule 40 PVC screen with 0.010-inch slots. The screen of each monitoring well was placed below the top of the bedrock aquifer. Two-inch NSF certified schedule 40 PVC riser pipes were installed to approximately three feet above ground surface. The well annulus was filled with a sand filter pack, a high solids bentonite slurry seal, and cement-bentonite grout.

Locking steel protective covers and guard posts were cemented into place. To develop each well, a two-inch OD submersible pump removed a minimum of five volumes of water or pumped the well until it was dry.

Monitoring well MW-7 was located outside the southern property fence. Bedrock was encountered in the MW-7 borehole at 122 feet below grade. The well was pumped dry during development. The screened interval for MW-7 was placed from 126 feet to 136 feet below ground surface.

Monitoring well MW-8 was located just north of the parking lot and east of the main manufacturing building, about 300 feet west of Western Avenue. The first boring drilled at the location was abandoned and sealed to prevent potential cross contamination of lower layers after drilling through a confining layer. A second borehole was drilled 5 feet from the first borehole. The new borehole contains MW-8. Bedrock was encountered in the MW-8 borehole at 115 feet below grade. The well was pumped dry during development. The screened interval for MW-8 is from 120 feet to 130 feet below ground surface.

Monitoring well MW-9 was located north of the site near an abandoned dilapidated residence. The first boring drilled at the location was abandoned and sealed to prevent potential cross contamination of lower layers after drilling through a confining layer. A second borehole was drilled 12 feet south of the first borehole. The new borehole contains MW-9. Bedrock was encountered in the MW-9 borehole at 117.5 feet below grade. Approximately 55 gallons of water were pumped from the well during development. The screened interval for MW-9 is 124 to 134 feet below ground surface.

The relative elevations of the monitoring wells were surveyed on December 29, 1993. A notch to mark the elevation point was placed on the top of the riser of each monitoring well. An elevation of 400.00 feet was assumed for the top of the riser of MW-9. The relative elevation of MW-7 was 402.41 feet; the relative elevation of MW-8 was 393.31 feet.

The groundwater flow direction of the bedrock aquifer was determined using the relative elevations of the three wells. The flow direction is northeast; therefore, MW-7 is the upgradient background well.

Slug test data were collected on December 29, 1993, from monitoring wells using an In-Situ Hermit SE1000B datalogger. The data were used to calculate the hydraulic conductivity of the aquifer. The calculations were performed manually to solve the Hvorslev equation for a falling-head piezometer test. The average hydraulic

conductivity of MW-7 was 2.10×10^{-3} centimeters per second. The average hydraulic conductivity of MW-8 was 1.39×10^{-3} centimeters per second. The average hydraulic conductivity of MW-9 was 9.16×10^{-4} centimeters per second.

3.5 Groundwater Sampling

On September 2, 1993, the ESI field sampling team collected groundwater samples from the bedrock monitoring wells, MW-7, MW-8, and MW-9. AMCA representatives elected to split the samples collected by the field team. Figure 3-1 presents sample locations; Table 3-1 summarizes sample locations and descriptions. MW-8 and MW-9 were purged and sampled using a Keck® pump. MW-7 was purged with a hand pump and sampled with a disposable bailer because well access was blocked by a fence that prevented the use of the pump. Sample jars were sealed, labelled, packaged, and transported to USEPA CLP participant laboratories in accordance with the QAPjP. Reusable sampling and personal protective equipment (PPE) were decontaminated before transport offsite. Disposable sampling and PPE items were decontaminated and discarded in accordance with the ESI work plan and QAPjP.

Groundwater samples scheduled for organic analysis were shipped to Industrial Environmental Analysts in Monroe, Connecticut, on September 2, 1993. Groundwater samples scheduled for inorganic analysis were shipped to American Analytical and Technical Services, Inc., in Baton Rouge, Louisiana, on September 2, 1993. Samples were analyzed for TCL and TAL substances under a routine analytical services request.

Water from five residential wells was sampled on August 31, 1993. Water was permitted to run for at least ten minutes to purge the wells and to ensure representative samples. AMCA representatives elected to split sample RW01, which was taken from the onsite drinking water well. Figure 3-1 presents sample locations; Table 3-1 summarizes sample locations and descriptions. Sample jars were sealed, labelled, packaged, and transported to USEPA CLP participant laboratories in accordance with the QAPjP.

Residential well water samples scheduled for organic analysis were shipped to Recra Environmental, Inc., in Tonawanda, New York, on September 1, 1993. Residential well water samples scheduled for inorganic analysis were shipped to ETS Analytical Services in Roanoke, Virginia, on September 1, 1993. Samples were analyzed for TCL and TAL substances under a special analytical services request.

3.6 Sediment Sampling

On August 30, 1993, the ESI field team collected one offsite and three onsite sediment samples. AMCA representatives split the onsite samples collected by the field team. Each sample was collected with a clean, stainless steel spoon and placed in a clean sample jar. Figure 3-1 shows each sample location; Table 3-1 summarizes sample locations and descriptions. Sample jars were sealed, labeled, packaged, and transported to USEPA CLP participant laboratories in accordance with procedures set forth in the QAPjP.

Sediment samples scheduled for organic analysis were shipped to Industrial Environmental Analysts in Monroe, Connecticut, on August 30, 1993. Sediment samples scheduled for inorganic analysis were shipped to American Analytical and Technical Services, Inc., in Baton Rouge, Louisiana, on August 30, 1993. Samples were analyzed for TCL and TAL substances under a routine analytical services request. Reusable sampling and PPE were decontaminated before transport offsite. Disposable sampling and PPE items were discarded in accordance with procedures outlined in the ESI site-specific implementation plan and the QAPjP.

Sediment sample ST01 was collected from the drainage ditch that drains the parking lot west of the manufacturing buildings. The sample was collected just inside the fence. ST02 was collected from the bank of the stream exiting the wetland north of the facility buildings and just off the dirt road north of the parking lot. ST03 was collected approximately 1,000 feet north of the manufacturing buildings in the bank of the same stream where ST02 was collected. The sample location was the western side of the stream as it crosses under Western Avenue. ST04 was collected about 300 feet south of the site, in a culvert passing under Western Avenue. Sediment sample locations were chosen to determine offsite migration of potential contaminants to the surface water pathway.

3.7 Analytical Results

This section summarizes analytical results from ESI samples. Appendix C presents ESI analytical data. Analysis of the five residential well samples indicates the presence of nine inorganic compounds. Analysis of the three bedrock monitoring well samples indicates that no organic compounds and two inorganic compounds were present in the groundwater. Laboratory analysis of the four sediment samples indicates that six organic compounds and three inorganic compounds were present.

3.8 Key Samples

Key samples are those samples that contain substances in sufficient concentration to document an observed release. Table 3-2 identifies ESI key samples.

Table 3-2 Key Sample Summary		
Groundwater (µg/L)		
Substance	Sample Number	
	GW02	GW03 Background
Cadmium	4.8 B	4.0 U
Chromium	8.0 B	7.0 U
Iron	733	109

Residential Well (µg/L)					
Substance	Sample Number				
	RW01	RW02 Background	RW03	RW04	RW05
Barium	33.4	1.7 B	82.4	81.2	69.1
Calcium	133000	1450	139000	183000	187000
Copper		5.2 UB		201 J	
Iron	449 J	43.4 UB	257 J	11100 J	3590 J
Lead		1.0 U		1.6 B	
Magnesium	72300	2180	70400	94200	98100
Manganese	4.9 B	2.0 U	3.0 B	74.3	40.7
Potassium	7000	2240		6720	
Selenium		2.0 UJ +		2.2 S	

Table 3-2 (Continued) Key Sample Summary				
Sediments (mg/kg)				
Substance	Sample Number			
	ST01	ST02	ST03	ST04 Background
Acetone			0.270 B	0.028 UB
2-Butanone			0.061	0.015 U
Toluene			0.031 B	0.003 UJB
Alpha-chlordane			0.940 PD	0.0052 P
Gamma-chlordane			0.160	0.0029 P
Aroclor-1248		0.280	47.000 PD	0.052 U
Cadmium			33.3	1.7
Chromium			823	61.9
Lead	28.6	38.0 S*	67.4 J+	20.0 US

GW	Groundwater sample.
RW	Residential well sample.
ST	Sediment sample.
B (inorganics)	Reported value is less than the contract required detection limit, but greater than or equal to the instrument detection limit.
B (organics)	Analyte found in the associated blank and in the sample, indicating possible/probable blank contamination. This flag must be used for a TIC as well as for a positively identified TCL compound.
J	Reported value was estimated.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	Substance is undetected. The reported value is the contract required quantitation limit.
P	Pesticide Aroclor target analyte when there is greater than 25 percent difference for detected concentrations between the two GC columns. The lower of the two values is reported and flagged with a "P".
D	Compounds identified in an analysis at a secondary dilution factor.
+	Correlation coefficient for the MSA of less than 0.995.
*	Duplicate analysis was not within control limits.

4.0 Characterization of Sources

4.1 Introduction

ESI historical data research and sample analytical results indicate one source at AMCA International: contaminated soil.

4.2 Waste Source: Contaminated Soil

4.2.1 Description

The site owner, DESA Industries, contracted ERM to perform a site remedial investigation in 1986. Soil samples were collected from several onsite disposal areas to determine if these sources had impacted site soil. A limited analytical program was conducted based on the historical use of possible wastes and contaminants at the facility. The remedial investigation report summarized the possible contaminants used at the site, including acid/caustics and plating solutions, alloy metals, cyanide, trichloroethylene and other degreasing solvents, cutting and quenching oils, and die-casting hydraulic oils.

During the ERM investigation, several onsite disposal areas were studied, including the sludge drying beds and Imhoff tank, a small burn area northeast of the Imhoff tank, a drum storage area east of the concrete pad, a large burn area adjacent to the western manufacturing area fence, a rubble area near the rear fence gate, a second drum storage area near the southwestern corner of the fenced manufacturing area, and an area adjacent to the north of the large burn area described above. Composited soil samples were collected from these disposal areas and compared to composited background soil samples collected near the western site border.

4.2.2 Waste Characteristics

Several rounds of soil sampling has been performed at the site. In 1986, ERM conducted a remedial investigation for the site. Results of the 1986 ERM samples collected at the sludge drying beds indicated no significant concentrations of hazardous substances. The small burn area results showed Aroclor-1254 [0.2 parts per million (ppm)] and trichloroethylene [29 parts per billion (ppb)]. Analysis of the drum storage composite samples indicated the presence of Aroclor-1248 (0.2 ppm), ethylbenzene (420 ppb), and toluene (3,500 ppb). Results of samples collected from the large burn area showed elevated amounts of barium (220 ppm), cadmium (7.3 ppm), chromium (110 ppm), copper (190 ppm), lead (1,600 ppm), manganese (1,500

ppm), molybdenum (15 ppm), zinc (320 ppm), Aroclor-1248 (130 ppm), tetrachloroethylene (39 ppb), 1,2-trans-dichloroethylene (200 ppb), and trichloroethylene (34 ppb). Analysis of samples collected from the rubble area near the rear fence indicated Aroclor-1248 (17 ppm), tetrachloroethylene (7 ppb), 1,2-trans-dichloroethylene (45 ppb), trichloroethylene (34 ppb), and zinc (250 ppm). Analysis of the second drum storage composite samples indicated the presence of barium (270 ppm), chromium (98 ppm), Aroclor-1248 (560 ppm), and trichloroethylene (29 ppb).

Test pits were dug in the area adjacent to the north of the large burn area described above and along the dirt roadway north of the manufacturing area. Composite soil samples were collected from depths to 3 feet below ground surface. Results of the samples showed elevated amounts of barium (300 ppm), cadmium (7.0 ppm), chromium (110 ppm), copper (600 ppm), lead (130 ppm), molybdenum (5.5 ppm), zinc (710 ppm), and Aroclor-1248 (69 ppm).

Test pits were also dug in the area along the dirt roadway north of the manufacturing area. Composite soil samples were collected from various depths. Results of samples showed elevated amounts of barium (560 ppm), cadmium (23 ppm), chromium (860 ppm), copper (2,100 ppm), lead (630 ppm), mercury (0.1 ppm), molybdenum (76 ppm), nickel (120 ppm), zinc (1,900 ppm), Aroclor-1248 (33 ppm), 1,2-trans-dichloroethylene (550 ppb), and trichloroethylene (12 ppb).

In 1990, E&E collected four investigative soil samples and one background soil sample during the SSI field sampling trip. Soil sample S1 was a composite of two areas in a former storage area located at the southwestern corner of the fenced manufacturing area. Sample S2 was a composite of two locations within barren ground located west and east of the manufacturing area's western fence. Sample S3 was a composite of two locations near the concrete pad at the west-central area of the property. Soil sample S6 was a composite of two areas along the northern shoulder of the dirt access road where scrap metal and other materials were strewn around the road. Background soil sample S7 was collected from an undisturbed area 400 feet north of the unnamed stream, near Western Avenue.

Results of the 1990 SSI soil sampling were compared to background soil conditions defined by sample S7. Analysis of the investigative samples indicated the presence of volatile and semi-volatile organic compounds, PCBs, and inorganic analytes. Sample S3 contained the most hazardous substances with the highest concentrations, including total xylenes (11 ppb). Semi-volatile organic compounds

include acenaphthene (520 ppb), fluorene (370 ppb), phenanthrene (6,000 ppb), anthracene (970 ppb), fluoranthene (9,800 ppb), pyrene (11,000 ppb), benzo(a)anthracene (7,000 ppb), chrysene (9,100 ppb), benzo(b)fluoranthene (9,000 ppb), benzo(k)fluoranthene (9,000 ppb), benzo(a)pyrene (5,500 ppb), indeno(1,2,3-cd)pyrene (5,700 ppb), dibenzo(a,h)anthracene (2,200 ppb), and benzo(g,h,i) perylene (700 ppb). Aroclor-1248 (750 ppb) and Aroclor-1254 (4,200 ppb) were detected. Inorganic analytes present in the sample included cadmium (3.5 ppm), chromium (148 ppm), copper (196 ppm), lead (456 ppm), magnesium (19,200 ppm), mercury (0.17 ppm), and zinc (208 ppm).

ESI analytical results indicate affected sediment contains volatile organic compounds, pesticides, PCBs, and heavy metals. Some of these contaminants also were found in the background sample at lower concentrations.

5.0 Discussion of Migration Pathways

5.1 Introduction

This section includes information useful in analyzing the potential impact of contaminants found at the AMCA site on the four migration pathways: groundwater, surface water, soil, and air.

5.2 Groundwater

Onsite boring logs indicated fill varies from 0 to 11 feet thick. Beneath the fill is 60 to 180 feet of Quaternary glacial till that contains occasional sand seams. Below the till is the Silurian Niagara Dolomite, the primary drinking water aquifer for the surrounding area (Hughes, et al. 1966). It is the predominant bedrock lithology in the area; however, one onsite borelog indicates shale is the uppermost bedrock type. In the area, the bedrock begins at a depth of 60 to 180 feet below ground surface and is about 400 feet thick. Three onsite bedrock monitoring wells were installed and sampled and five nearby residential bedrock drinking water wells were sampled during the ESI. The direction of groundwater flow in the area was determined to be north-northeast.

Previous analysis of water samples collected from the glacial till aquifer document an observed release to that aquifer (E&E 1991). Hydraulic connection exists between the Silurian Niagara Dolomite aquifer and the overlying glacial till aquifer (Csallany and Walton 1963).

Five nearby residential drinking water wells were sampled during the ESI. These wells, located north, east, and south of the site, draw water from the bedrock aquifer. The chemical analysis of RW01, an onsite drinking water well, indicated the presence of six inorganic compounds. RW02 was an upgradient, background well located at a private residence approximately 900 feet south of the site. Chemical analysis of RW03, a residential well located approximately 300 feet east of the site, indicated the presence of five inorganic compounds. Chemical analysis of RW04, a residential well located approximately 900 feet west of the site, indicated the presence of nine inorganic compounds. The chemical analysis of RW05, a residential well located approximately 1,200 feet northeast of the site, indicated the presence of five inorganic compounds.

Three onsite bedrock monitoring wells were installed and sampled during the ESI. Chemical analysis of GW02, a downgradient monitoring well, indicated the

presence of three inorganic compounds. A potential for direct contact with affected groundwater exists near the site based on the presence of inorganic compounds downgradient residential drinking water wells.

Groundwater is used as the sole source of drinking water within four miles of the site (Tables 5-1 and 5-2). The communities of Chicago Heights and Matteson are served by City of Chicago water drawn from Lake Michigan. Municipal systems provide drinking water to 72,759 people within four miles of the site. Approximately 713 private wells exist within four miles of the site; these wells serve about 2,018 people. Most private wells within four miles of the site are screened in the Silurian Niagara Dolomite aquifer. The population figure of 2,018 was obtained by counting houses that were listed by the Illinois State Water Survey as having a private well and multiplying that number by 2.83, which is the average number of persons per household in Cook and Will Counties (ISWS 1992, USDC 1990).

5.3 Surface Water

Four sediment samples were collected during the ESI. Chemical analysis of the samples indicated the presence of six organic compounds and three inorganic compounds. Plant employees and people downgradient of the site are potential targets for direct contact with affected site sediments. Sediment sample ST03, collected from the unnamed stream just as it exits the site to the east, contained three volatile organic compounds, three pesticides/PCBs, and three inorganic analytes. The unnamed stream flows past a residential area downstream of the sample point.

Runoff on the western side of the manufacturing area is diverted to a drainage ditch that empties into a marsh. The marsh flows into the unnamed stream that exits the property to the east beneath Western Avenue. The facility maintains a National Pollution Discharge Elimination System outfall at the eastern end of the marsh (E&E 1991). The outfall discharges runoff collected from the employee parking lot located along the eastern site border. The unnamed stream eventually joins Thorn Creek about a mile north of the site.

Downstream targets along the surface water pathway include wetlands, sensitive environments, and potential areas where recreational fishing might take place. Thorn Creek passes through Thorn Creek State Nature Preserve. The 15-mile surface water pathway is comprised of wetlands, as designated by the U.S. Fish and Wildlife Service National Wetlands Inventory maps.

Table 5-1 Municipal Water Supply Sources Within Four Miles of Site			
Distance from Site	Municipality	No. Wells/ Approx. Pop. Served	Source Type
1 to 2 miles	University Park	4 wells/6,204	Bedrock - Silurian
	Crete	2 wells/2,709	
	S. Chicago Heights	3 wells/3,597	
	Park Forest	1 well/3,522	
2 to 3 miles	Crete	3 wells/4,064	Bedrock - Silurian
	Steger	3 wells/8,584	
	Park Forest	6 wells/21,134	
	Richton Park	3 wells/10,523	
3 to 4 miles	Monee	2 wells/1,044	Bedrock - Silurian
	Matteson	1 backup well/11,378	

Table 5-2 Private Well Users Within Four Miles of Site	
Radial Distance from Site in Miles	Approximate Population Served by Private Wells
0 to 0.25	14
0.25 to 0.5	51
0.5 to 1	212
1 to 2	249
2 to 3	603
3 to 4	889
Total Population	2,018

5.4 Soil Exposure

The site owner performed a soil investigation in 1986. Soil samples were collected from several onsite disposal areas to determine if these sources had impacted site soil. A limited analytical program was conducted based on the historical use of possible wastes and contaminants at the facility. The investigation report summarized the possible contaminants used at the site, including acid/caustics and plating solutions, alloy metals, cyanide, trichloroethylene and other degreasing solvents, cutting and quenching oils, and die-casting hydraulic oils.

During the investigation, several onsite disposal areas were studied, including the sludge drying beds and Imhoff tank, a small burn area northeast of the Imhoff tank, a drum storage area east of the concrete pad, a large burn area adjacent to the western manufacturing area fence, a rubble area near the rear fence gate, a second drum storage area near the southwestern corner of the fenced manufacturing area, and an area adjacent to the north of the large burn area described above. Compositing soil samples were collected from these disposal areas and compared to compositing background soil samples collected near the western site border.

Results of the soil samples collected at the sludge drying beds indicated no significant concentrations of hazardous substances. The small burn area results showed PCBs and volatile organic compounds. Analysis of the drum storage composite samples indicated the presence of PCBs and volatile organic compounds. Results of samples collected from the large burn area showed elevated amounts of inorganic analytes, PCBs, and volatile organic compounds. Analysis of samples collected from the rubble area near the rear fence indicated PCBs, inorganic analytes, and volatile organic compounds. Analysis of the second drum storage composite samples indicated the presence of inorganic analytes, PCBs, and volatile organic compounds.

Test pits were dug in the area adjacent to the north of the large burn area described above. and along the dirt roadway north of the manufacturing area. Composite soil samples were collected from depths up to 3 feet below ground surface. Results of the samples showed elevated amounts of inorganic analytes and PCBs. Test pits were also dug in the area along the dirt roadway north of the manufacturing area. Composite soil samples were collected from various depths. Results of samples showed elevated amounts of PCBs, inorganic analytes, and volatile organic compounds.

In 1990, E&E collected four investigative soil samples and one background soil sample during the SSI field sampling trip. Soil sample S1 was a composite of two areas in a former storage area located at the southwestern corner of the fenced manufacturing area. Sample S2 was a composite of two locations within barren ground located west and east of the manufacturing area's western fence. Sample S3 was a composite of two locations near the concrete pad at the west-central area of the property. Soil sample S6 was a composite of two areas along the northern shoulder of the dirt access road where scrap metal and other materials were strewn around the road. Background soil sample S7 was collected from an undisturbed area 400 feet north of the unnamed stream, near Western Avenue. Results of the soil sampling were compared to background soil conditions. Analysis of the investigative samples indicated the presence of volatile and semi-volatile organic compounds, PCBs, and inorganic analytes.

The onsite population consists of approximately 216 facility employees. The population within a 1-mile radius of the site is approximately 5,798. The population within one-half mile of the site was obtained by counting houses on the United States Geological Survey 7.5 minute quadrangles and then multiplying that number by 2.83, which is the average number of persons per household in Cook and Will Counties. The population greater than one mile from the site was estimated by determining the percent of a city's area within each distance ring and multiplying that number by that percentage of the city's population (USGS 1990 and 1991, USDC 1990). City percentage populations for each distance ring were added up. This method also was used to determine air pathway populations.

5.5 Air

No past or present air sampling has been conducted at the AMCA site. Wind direction is assumed to be from the southwest. Site topography, which is generally flat, would not hinder wind transportation of particulate substances offsite.

Potential air pathway targets include residences, forest preserve property, and sensitive environments. The nearest residences are immediately adjacent to the AMCA property line. Farmland and sensitive environments are scattered throughout the areas adjacent to the site. Approximately 105,540 people live within four miles of the site.

6.0 References

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APPENDIX A – 15-MILE SURFACE WATER ROUTE MAP

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Appendix A

**AMCA International Corp.
(a.k.a. Continental-Midland, Inc.)**

15-Mile Surface Water Route Map

Appendix B

AMCA International Corp.
(a.k.a. Continental-Midland, Inc.)

Target Compound List and
Target Analyte List

Target Compound List

Volatiles

Chloromethane	1,2-Dichloropropane
Bromomethane	Cis-1,3-Dichloropropene
Vinyl Chloride	Trichloroethene
Chloroethane	Dibromochloromethane
Methylene Chloride	1,1,2-Trichloroethane
Acetone	Benzene
Carbon Disulfide	trans-1,3-Dichloropropane
1,1-Dichloroethene	Bromoform
1,1-Dichloroethane	4-Methyl-2-pentanone
1,2-Dichloroethene (total)	2-Hexanone
Chloroform	Tetrachloroethene
1,2-Dichloroethane	Toluene
2-Butanone	1,1,2,2-Tetrachloroethane
1,1,1-Trichloroethane	Chlorobenzene
Carbon Tetrachloride	Ethyl benzene
Bromodichloromethane	Styrene
	Xylenes (total)

Source: Target Compound List for water and soil with low or medium levels of volatile and semi-volatile organic contaminants, as shown in the Quality Assurance Project Plan for Region V Superfund Site Assessment Program, September 27, 1991.

Target Compound List (Continued)

Semi-Volatiles

Phenol	Acenaphthene
bis(2-Chloroethyl) ether	2,4-Dinitrophenol
2-Chlorophenol	4-Nitrophenol
1,3-Dichlorobenzene	Dibenzofuran
1,4-Dichlorobenzene	2,4-Dinitrotoluene
1,2-Dichlorobenzene	Diethylphthalate
2-Methylphenol	4-Chlorophenyl-phenyl ether
2,2-oxybis-(1-Chloropropane)*	Fluorene
4-Methylphenol	4-Nitroaniline
N-Nitroso-di-n-dipropylamine	4,6-Dinitro-2-methylphenol
Hexachloroethane	N-Nitrosodiphenylamine
Nitrobenzene	4-Bromophenyl-phenyl ether
Isophorone	Hexachlorobenzene
2-Nitrophenol	Pentachlorophenol
2,4-Dimethylphenol	Phenanthrene
bis(2-Chloroethoxy) methane	Anthracene
2,4-Dichlorophenol	Carbazole
1,2,4-Trichlorobenzene	Di-n-butylphthalate
Naphthalene	Fluoranthene
4-Chloroaniline	Pyrene
Hexachlorobutadiene	Butylbenzylphthalate
4-Chloro-3-methylphenol	3,3-Dichlorobenzidine
2-Methylnaphthalene	Benzo(a)anthracene
Hexachlorocyclopentadiene	Chrysene
2,4,6-Trichlorophenol	bis(2-Ethylhexyl)phthalate
2,4,5-Trichlorophenol	Di-n-Octylphthalate
2-Chloronaphthalene	Benzo(b)fluoranthene
2-Nitroaniline	Benzo(k)fluoranthene
Dimethylphthalate	Benzo(a)pyrene
Acenaphthylene	Indeno(1,2,3-cd)pyrene
2,6-Dinitrotoluene	Dibenzo(a,h)anthracene
3-Nitroaniline	Benzo(g,h,i)perylene

*Previously known by the name of bis(2-chloroisopropyl) ether.

Source: Target Compound List for water and soil with low or medium levels of volatile and semi-volatile organic contaminants, as shown in the Quality Assurance Project Plan for Region V Superfund Site Assessment Program, September 27, 1991.

Target Compound List (Continued)

Pesticide/PCB

alpha-BHC	4,4-DDT
beta-BHC	Methoxychlor
delta-BHC	Endrin ketone
gamma-BHC (Lindane)	Endrin aldehyde
Heptachlor	alpha-chlordane
Aldrin	gamma-chlordane
Heptachlor epoxide	Toxaphene
Endosulfan I	Aroclor-1016
Dieldrin	Aroclor-1221
4,4-DDE	Aroclor-1232
Endrin	Aroclor-1242
Endosulfan II	Aroclor-1248
4,4-DDD	Aroclor-1254
Endosulfan sulfate	Aroclor-1260

Source: Target Compound List for water and soil containing less than high concentrations of pesticides/aroclor, as shown in the Quality Assurance Project Plan for Region V Superfund Site Assessment Program, September 27, 1991.

Target Analyte List

Aluminum	Magnesium
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Potassium
Cadmium	Selenium
Calcium	Silver
Chromium	Sodium
Cobalt	Thallium
Copper	Vanadium
Iron	Zinc
Lead	Cyanide

Source: Target Analyte List in the Quality Assurance Project Plan for Region V Superfund Site Assessment Program, September 27, 1991.

Appendix C

AMCA International Corp.
(a.k.a. Continental-Midland, Inc.)

Analytical Results

Appendix C

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Data Reporting Qualifiers

Definitions for Organic Chemical Data Qualifiers

- R - Indicates that the data are unusable. The compound may or may not be present.
- U - Indicates compound was analyzed for but not detected. The associated numerical value is the sample quantitation limit.
- J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.
- N - Indicates presumptive evidence of a compound. This flag is only used for TICs where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, the N code is not used.
- P - This flag is used for a pesticide Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported and flagged with a "P".
- C - This flag applies to results where identification has been confirmed by GC/MS.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag must be used for a TIC as well as for a positively identified TCL compound.
- E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for the specific analysis. This flag will not apply to pesticide/PCBs analyzed by GC/MS methods. If one or more compounds have a response greater than full scale, the sample or extract must be diluted and re-analyzed according to the specifications.
- D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- A - This flag indicates that a TIC is a suspected aldol-condensation product.
- X - Other specific flags may be required to properly define the results. The "X" flags are fully described on the data tables.

Data Reporting Qualifiers
Definitions for Inorganic Chemical Data Qualifiers

- R - Indicates that the data are unusable. The compound may or may not be present.
- U - Indicates compound was analyzed for but not detected. The associated numerical value is the sample quantitation limit.
- J - Indicates an estimated value.
- B - Indicates that the reported value is less than the Contract Required Detection Limit (CRDL), but greater than or equal to the Instrument Detection Limit (IDL).
- E - The reported value is estimated because of the presence of interference.
- M - Duplicate injection precision criteria not met.
- N - Spiked sample recovery not within control limits.
- S - The reported value was determined by the Method of Standard Additions (MSA).
- W - Post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- * - Duplicate analysis was not within control limits.
- + - Correlation coefficient for the MSA was less than 0.995.

Volatile Organic Analysis for Residential Well Water
AMCA International

Volatile Compound	Sample Location and Number Concentrations in ug/L				
	RW01 HQ1	RW02 HQ2	RW03 HQ4	RW04 HQ5	RW05 HQ6
Chloromethane	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Methylene Chloride	2 UJ	2 UJ	2 UJ	2 U	2 U
Acetone	22 UJ	23 UJ	25 UJ	22 UJ	24 UJ
Carbon Disulfide	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 UJ	1 U	1 U	1 U
1,2-Dichloroethane	7 U	10 U	13 U	5 U	10 U
2-Butanone	5 RUJ	5 RUJ	5 RUJ	5 RUJ	5 RUJ
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	1 U	1 UJ	1 UJ	1 UJ	0.7 J
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	0.06 J	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U
Benzene	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	5 U	5 U	5 U	5 U	5 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U
Toluene	1 UJ	1 UJ	0.06 J	0.7 J	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 UB	1 UB	1 UB	1 UB	1 UB
Styrene	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
Total Xylenes	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U
Total Number of TICs *	4	1	2	2	2

* - Number, not concentration, of tentatively identified compounds (TICs) found in each sample.

RW01

Semi-volatile Organic Analysis for Residential Well Water
AMCA International

Semi-volatile Compound	Sample Location and Number				
	Concentrations in ug/L				
	RW01 HQ1	RW02 HQ2	RW03 HQ4	RW04 HQ5	RW05 HQ6
Phenol	5 U	5 U	5 U	5 U	5 U
bis(2-Chloroethyl)Ether	5 U	5 U	5 U	5 U	5 U
2-Chlorophenol	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U
2-Methylphenol	5 U	5 U	5 U	5 U	5 U
2,2'-oxybis(1-Chloropropane	5 U	5 U	5 U	5 U	5 U
4-Methylphenol	5 U	5 U	5 U	5 U	5 U
n-Nitroso-Di-n-Propylamine	5 U	5 U	5 U	5 U	5 U
Hexachloroethane	5 U	5 U	5 U	5 U	5 U
Nitrobenzene	5 U	5 U	5 U	5 U	5 U
Isophorone	5 U	5 U	5 U	5 U	5 U
2-Nitrophenol	5 U	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	5 U	5 U	5 U	5 U	5 U
bis(2-Chloroethoxy)Methane	5 U	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	5 U	5 U	5 U	5 U	5 U
Naphthalene	5 U	5 U	5 U	5 U	5 U
4-Chloroaniline	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene	5 U	5 U	5 U	5 U	5 U
4-Chloro-3-Methylphenol	5 U	5 U	5 U	5 U	5 U
2-Methylnaphthalene	5 U	5 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	5 U	5 U	5 U	5 U	5 U
2,4,6-Trichlorophenol	5 U	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	20 U	20 U	20 U	20 U	20 U
2-Chloronaphthalene	5 U	5 U	5 U	5 U	5 U
2-Nitroaniline	20 U	20 U	20 U	20 U	20 U
Dimethyl Phthalate	5 U	5 U	5 U	5 U	5 U
Acenaphthylene	5 U	5 U	5 U	5 U	5 U

Semi-volatile Organic Analysis for Residential Well Water
AMCA International

Semi-volatile Compound	Sample Location and Number				
	Concentrations in ug/L				
	RW01 HQ1	RW02 HQ2	RW03 HQ4	RW04 HQ5	RW05 HQ6
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U
3-Nitroaniline	20 U	20 U	20 U	20 U	20 U
Acenaphthene	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrophenol	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ
4-Nitrophenol	20 U	20 U	20 U	20 U	20 U
Dibenzofuran	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U
Diethylphthalate	5 U	5 U	5 U	5 U	5 U
4-Chlorophenyl-phenylether	5 U	5 U	5 U	5 U	5 U
Fluorene	5 U	5 U	5 U	5 U	5 U
4-Nitroaniline	20 U	20 U	20 U	20 U	20 U
4,6-Dinitro-2-Methylphenol	20 U	20 U	20 U	20 U	20 U
n-Nitrosodiphenylamine	5 U	5 U	5 U	5 U	5 U
4-Bromophenyl-phenylether	5 U	5 U	5 U	5 U	5 U
Hexachlorobenzene	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	20 U	20 U	20 U	20 U	20 U
Phenanthrene	5 U	5 U	5 U	5 U	5 U
Anthracene	5 U	5 U	5 U	5 U	5 U
Carbazole	5 U	5 U	5 U	5 U	5 U
di-n-Butylphthalate	5 U	5 U	5 U	5 U	5 U
Fluoranthene	5 U	5 U	5 U	5 U	5 U
Pyrene	5 U	5 U	5 U	5 U	5 U
Butylbenzylphthalate	5 U	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	5 U	5 U	5 U	5 U	5 U
Benzo(a)Anthracene	5 U	5 U	5 U	5 U	5 U
Chrysene	5 U	5 U	5 U	5 U	5 U
bis(2-Ethylhexyl)Phthalate	5 U	5 U	0.6 J	5 U	5 U
di-n-Octyl Phthalate	5 U	5 U	5 U	5 U	5 U
Benzo(b)Fluoranthene	5 U	5 U	5 U	5 U	5 U
Benzo(k)Fluoranthene	5 U	5 U	5 U	5 U	5 U
Benzo(a)Pyrene	5 U	5 U	5 U	5 U	5 U
Indeno(1,2,3-cd)Pyrene	5 U	5 U	5 U	5 U	5 U
Dibenzo(a,h)Anthracene	5 U	5 U	5 U	5 U	5 U
Benzo(g,h,i)Perylene	5 U	5 U	5 U	5 U	5 U
Total Number of TICs*	4	2	1	4	3

* Number, not concentration, of tentatively identified compounds (TICs) found in each sample.

RWW-sv

Pesticide/PCB Analysis for Residential Well Water
AMCA International

Pesticide/ PCB	Sample Locations and Number Concentrations in ug/L				
	RW01 HQ1	RW02 HQ2	RW03 HQ4	RW04 HQ5	RW05 HQ6
Alpha-BHC	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Beta-BHC	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Delta-BHC	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Gamma-BHC (Lindane)	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Heptachlor	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Aldrin	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Heptachlor Epoxide	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Endosulfan I	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Dieldrin	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
4,4'-DDE	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Endrin	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Endosulfan II	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
4,4'-DDD	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Endosulfan Sulfate	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
4,4'-DDT	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Methoxychlor	0.10 U	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Endrin Ketone	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Endrin Aldehyde	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Alpha-Chlordane	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Gamma-Chlordane	0.010 U	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ
Toxaphene	1.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Aroclor-1016	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1221	0.40 U	0.40 UJ	0.40 UJ	0.40 UJ	0.40 UJ
Aroclor-1232	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1242	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1248	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1254	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ
Aroclor-1260	0.20 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 UJ

swpest wk4

Inorganic Analysis for Residential Well Water
AMCA International

Metals and Cyanide	Sample Location and Number				
	Concentrations in ug/L				
	RW01 S-02-1	RW02 S-02-2	RW03 S-02-4	RW04 S-02-5	RW05 S-02-6
Aluminum	31.0 UJ*	229 J*	31.0 UJ*	31.0 UJ*	53.1 JB*
Antimony	48.0 U	48.0 U	48.0 U	48.0 U	48.0 U
Arsenic	3.6 RB	2.0 RU	2.2 RB	2.0 RU	5.8 R
Barium	33.4	1.7 B	82.4	81.2	69.1
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	0.10 U	0.10 U	0.10 U	0.10 US	0.10 US
Calcium	133000	1450	139000	183000	187000
Chromium	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Cobalt	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Copper	5.3 UB	5.2 UB	5.0 U	201 J	5.0 U
Iron	449 J	43.4 UB	257 J	11100 J	3590 J
Lead	1.0 U	1.0 U	1.0 U	1.6 B	1.0 U
Magnesium	72300	2180	70400	94200	98100
Manganese	4.9 B	2.0 U	3.0 B	74.3	40.7
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	16.0 U	16.0 U	16.0 U	16.0 U	16.0 U
Potassium	7000	2240	6020	6720	3400
Selenium	2.0 US	2.0 UJ+	2.0 US	2.2 S	2.0 US
Silver	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Sodium	21500 J	446000 J	19400 J	51100 J	21100 J
Thallium	1.0 RUS	1.0 RUS	1.8 RBS	1.0 RUS	1.0 RUS
Vanadium	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U
Zinc	10.2 UB	15.5 UB	12.5 UB	62.0 J	9.6 UB
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Volatile Organic Analysis for Residential Well Water Tentatively Identified Compounds AMCA International		
RW-01 (HQ1)		
Compound Name	Retention Time	Estimated Concentration (ug/L)
Ethane, 1-bromo-2-chloro-	14.87	2.9 UJN
Unknown	15.57	2.1 J
Unknown siloxane	19.04	7.1 UJ
Unknown siloxane	21.67	21 J
RW-02 (HQ2)		
Compound Name	Retention Time	Estimated Concentration (ug/L)
Ethane, 1-bromo-2-chloro-	14.87	4.1 UJN
RW-03 (HQ4)		
Compound Name	Retention Time	Estimated Concentration (ug/L)
Ethane, 1-bromo-2-chloro-	14.90	5.3 U
Tetrahydrotetramethyl furan	15.85	2.1 J
RW-04 (HQ5)		
Compound Name	Retention Time	Estimated Concentration (ug/L)
Ethane, 1-bromo-2-chloro-	14.89	2.1 U
Unknown siloxane	19.04	3.3 J
RW-05 (HQ6)		
Compound Name	Retention Time	Estimated Concentration (ug/L)
Ethane, 1-bromo-2-chloro-	14.90	4.1 U
Unknown siloxane	19.07	43 J

TIC/VOA

Semi-volatile Organic Analysis for Residential Well Water
Tentatively Identified Compounds
AMCA International

RW-01 (HQ1)

Compound Name	Retention Time	Estimated Concentration (ug/L)
Cyclohexenol isomer	5.62	33 UJ
2-cyclohexen-1-one	6.55	11 JN
Unknown	9.49	21 J
2,6-dimethyl-6-nitro-2-heptene	11.29	20 JN

RW-02 (HQ2)

Compound Name	Retention Time	Estimated Concentration (ug/L)
Cyclohexenol isomer	5.62	30 UJB
Unknown	9.49	20 J

RW-03 (HQ4)

Compound Name	Retention Time	Estimated Concentration (ug/L)
Cyclohexenol isomer	5.60	17 UJB

RW-04 (HQ5)

Compound Name	Retention Time	Estimated Concentration (ug/L)
Cyclohexenol isomer	5.63	35 UJB
Cyclohexene 3-chloro-	6.02	12 JN
Trichloropropene isomer	6.93	21 J
2,6-dimethyl-6-nitro-2-heptene	11.29	49 UJN

RW-05 (HQ6)

Compound Name	Retention Time	Estimated Concentration (ug/L)
Cyclohexenol isomer	5.63	42 UJB
2-cyclohexen-1-one	6.57	17 JN
2-Chlorocyclohexanol	8.84	22 UJN

TICSVOA

Volatile Organic Analysis for Groundwater
AMCA International

Volatile Compound	Sample Location and Number Concentrations in ug/L		
	GW01 EJZ10	GW02 EJZ11	GW03 EJZ13
Chloromethane	10 UJ	10 UJ	10 UJ
Bromomethane	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U
Acetone	13 UB	24 UB	16 UB
Carbon Disulfide	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U
1,2-Dichloroethane	10 UJ	10 UJ	7 J
2-Butanone	10 UJ	10 UJ	10 UJ
1,1,1-Trichloroethane	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
Benzene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
Toluene	10 U	6 J	10 U
Chlorobenzene	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U
Styrene	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U
Total Number of TICs *	0	1	2

* - Number, not concentration, of tentatively identified compounds (TICS) found in each sample.

Semi-volatile Organic Analysis for Groundwater
AMCA International

Semi-volatile Compound	Sample Location and Number		
	Concentrations in ug/L		
	GW01 EJZ10	GW02 EJZ11	GW03 EJZ13
Phenol	10 U	10 U	10 U
bis(2-Chloroethyl)Ether	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U
n-Nitroso-Di-n-Propylamine	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U
Nitrobenzene	10 UJ	10 UJ	10 UJ
Isophorone	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U
bis(2-Chloroethoxy)Methane	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 UJ	10 UJ	10 UJ
2,4,6-Trichlorophenol	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U
2-Chloronaphthalene	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U
Dimethyl Phthalate	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U

Semi-volatile Organic Analysis for Groundwater
AMCA International

Semi-volatile Compound	Sample Location and Number		
	Concentrations in ug/L		
	GW01 EJZ10	GW02 EJZ11	GW03 EJZ13
2,6-Dinitrotoluene	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U
Dibenzofuran	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U
4,6-Dinitro-2-Methylphenol	25 U	25 U	25 U
n-Nitrosodiphenylamine	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U
di-n-Butylphthalate	10 UJB	10 UJB	10 UJB
Fluoranthene	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	0.6 J
3,3'-Dichlorobenzidine	10 U	10 U	10 U
Benzo(a)Anthracene	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U
bis(2-Ethylhexyl)Phthalate	10 UJB	10 UJB	10 UJB
di-n-Octyl Phthalate	10 U	10 U	10 U
Benzo(b)Fluoranthene	10 U	10 U	10 U
Benzo(k)Fluoranthene	10 U	10 U	10 U
Benzo(a)Pyrene	10 U	10 U	10 U
Indeno(1,2,3-cd)Pyrene	10 U	10 U	10 U
Dibenzo(a,h)Anthracene	10 U	10 U	10 U
Benzo(g,h,i)Perylene	10 U	10 U	10 U
Total Number of TICs*	3	2	19

* Number, not concentration, of tentatively identified compounds (TICs) found in each sample.

gw-sv

Pesticide/PCB Analysis for Groundwater			
AMCA International			
Pesticide/ PCB	Sample Location and Number		
	GW01 EJZ10	GW02 EJZ11	GW03 EJZ13
Alpha-BHC	0.050 U	0.050 UJ	0.050 U
Beta-BHC	0.050 U	0.050 UJ	0.050 U
Delta-BHC	0.050 U	0.050 UJ	0.050 U
Gamma-BHC (Lind.)	0.050 U	0.050 UJ	0.050 U
Heptachlor	0.050 UJ	0.050 UJ	0.050 U
Aldrin	0.050 UJ	0.050 UJ	0.050 U
Heptachlor Epoxide	0.050 U	0.050 UJ	0.050 U
Endosulfan I	0.050 U	0.050 UJ	0.050 U
Dieldrin	0.10 UJ	0.10 UJ	0.10 U
4,4'-DDE	0.10 U	0.10 UJ	0.10 U
Endrin	0.10 U	0.10 UJ	0.10 U
Endosulfan II	0.10 U	0.10 UJ	0.10 U
4,4'-DDD	0.10 U	0.10 UJ	0.10 U
Endosulfan Sulfate	0.10 U	0.10 UJ	0.10 U
4,4'-DDT	0.10 U	0.10 UJ	0.10 U
Methoxychlor	0.50 U	0.50 UJ	0.50 U
Endrin Ketone	0.10 U	0.10 UJ	0.10 U
Endrin Aldehyde	0.10 U	0.10 UJ	0.10 U
Alpha-Chlordane	0.050 U	0.050 UJ	0.050 U
Gamma-Chlordane	0.050 U	0.050 UJ	0.050 U
Toxaphene	5.0 U	5.0 UJ	5.0 U
Aroclor-1016	1.0 U	1.0 UJ	1.0 U
Aroclor-1221	2.0 U	2.0 UJ	2.0 U
Aroclor-1232	1.0 U	1.0 UJ	1.0 U
Aroclor-1242	1.0 U	1.0 UJ	1.0 U
Aroclor-1248	1.0 U	1.0 UJ	1.0 U
Aroclor-1254	1.0 U	1.0 UJ	1.0 U
Aroclor-1260	1.0 U	1.0 UJ	1.0 U

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Inorganic Analysis for Groundwater Samples AMCA International			
Metals and Cyanide	Sample Locations and Number Concentrations in ug/L		
	GW01 MEJJ 87	GW02 MEJJ88	GW03 MEJJ90
Aluminum	169 JB	382 J	367 J
Antimony	24.0 U	24.0 U	24.0 U
Arsenic	3.0 UJW	3.0 U	7.2 BS
Barium	73.5 B	65.7 B	68.1 B
Beryllium	1.0 U	1.0 U	1.0 U
Cadmium	4.0 U	4.8 B	4.0 U
Calcium	141000 JE	133000 JE	131000 JE
Chromium	7.0 U	8.0 B	7.0 U
Cobalt	5.0 U	5.0 U	57.5
Copper	5.0 U	5.0 U	5.4 B
Iron	129 J	733	109 J
Lead	3.0 U	3.0 U	3.0 U
Magnesium	62500 JE	69500 JE	73600 JE
Manganese	12.1 B	12.8 B	25.4
Mercury	0.20 U	0.20 U	0.20 U
Nickel	7.0 U	7.0 U	19.6 B
Potassium	8730 JE	8910 JE	8620 JE
Selenium	30.0 U	30.0 UW	30.0 U
Silver	5.0 U	5.0 U	5.0 U
Sodium	28000 JE	27500 JE	33000 JE
Thallium	4.0 U	4.0 U	4.0 U
Vanadium	4.0 U	4.0 U	4.0 U
Zinc	25.8 J	5.0 U	6.3 JB
Cyanide	10.0 UJ	10.0 UJ	Not Analyzed

gw-mtals

Volatile Organic Analysis for Groundwater Tentatively Identified Compounds AMCA International		
GW02 (EJZ11)		
Compound Name	Retention Time	Estimated Concentration (ug/L)
Silanol, trimethyl-	8.530	11 JN
GW03 (EJZ13)		
Compound Name	Retention Time	Estimated Concentration (ug/L)
Cyclotetrasiloxane, octameth	21.610	55 JN
Unknown siloxane	24.570	21 J

TICVOAGW

Semi-volatile Organic Analysis for Groundwater
Tentatively Identified Compounds
AMCA International

GMW01 (EJZ10)

Compound Name	Retention Time	Estimated Concentration (ug/L)
Aldol Condensation Product	4.280	10 UJAB
Unknown	9.470	8 J
Unknown	10.770	2 J

GW02 (EJZ11)

Compound Name	Retention Time	Estimated Concentration (ug/L)
Aldol Condensation Product	4.280	10 UJAB
Unknown	4.640	5 UJB

GW03 (EJZ13)

Compound Name	Retention Time	Estimated Concentration (ug/L)
Aldol Condensation Product	4.270	5 UJAB
Unknown	6.060	4 J
Unknown	13.960	1000 J
Unknown	22.910	3 J
Unknown	24.640	26 J
Unknown Alkane	25.190	3 J
Unknown Alkane	26.030	4 J
Unknown Alkane	26.820	5 J
Unknown Alkane	27.580	6 J
Unknown	27.780	9 J
Unknown	28.070	35 J
Unknown Alkane	28.310	8 J
Unknown	28.620	2 J
Unknown Alkane	29.030	6 J
Unknown Alkane	29.780	4 J
Unknown Alkane	30.640	3 J
Unknown Acid	31.330	39 J
Unknown	33.740	43 J
Unknown	35.780	12 J

TICS\GW

Volatile Organic Analysis for Sediment
AMCA International

Volatile Compound	Sample Location and Number			
	Concentrations in ug/kg			
	ST01 EJZ06	ST02 EJZ07	ST03 EJZ08	ST04 EJZ09
Chloromethane	15 UJ	14 UJ	18 UJ	15 UJ
Bromomethane	15 U	14 U	18 U	15 U
Vinyl Chloride	15 U	14 U	18 U	15 U
Chloroethane	15 U	14 U	18 U	15 U
Methylene Chloride	15 UJB	14 U	18 UJB	15 UJB
Acetone	15 UB	26 UB	270 B	28 UB
Carbon Disulfide	15 U	2 J	1 J	15 U
1,1-Dichloroethene	15 U	14 U	18 U	1 J
1,1-Dichloroethane	15 U	14 U	18 U	15 U
1,2-Dichloroethene (total)	15 U	14 U	18 U	15 U
Chloroform	15 U	14 U	18 U	15 U
1,2-Dichloroethane	15 U	14 U	18 UJ	15 U
2-Butanone	4 J	14 U	61	15 U
1,1,1-Trichloroethane	15 U	14 U	18 U	15 U
Carbon Tetrachloride	15 U	14 U	18 U	15 U
Bromodichloromethane	15 U	14 U	18 U	15 U
1,2-Dichloropropane	15 U	14 U	18 U	15 U
cis-1,3-Dichloropropene	15 U	14 U	18 U	15 U
Trichloroethene	15 U	14 U	18 U	15 U
Dibromochloromethane	15 U	14 U	18 U	15 U
1,1,2-Trichloroethane	15 U	14 U	18 U	15 U
Benzene	15 U	14 U	18 U	2 J
trans-1,3-Dichloropropene	15 U	14 U	18 U	15 U
Bromoform	15 U	14 U	18 U	15 U
4-Methyl-2-Pentanone	15 UJ	14 UJ	18 U	15 U
2-Hexanone	15 U	14 U	18 U	15 U
Tetrachloroethene	15 U	14 U	18 U	15 U
1,1,2,2-Tetrachloroethane	15 U	14 U	18 U	15 U
Toluene	15 U	14 U	31 B	3 UJB
Chlorobenzene	15 U	14 U	18 U	15 U
Ethylbenzene	15 U	14 U	12 J	15 U
Styrene	15 U	14 U	18 U	15 U
Xylene (total)	15 U	14 U	18 U	15 U
Total Number of TICs *	7	0	10	5

* - Number, not concentration, of tentatively identified compounds (TICs) found in each sample

Semi-volatile Organic Analysis for Sediment
AMCA International

Semi-volatile Compound	Sample Location and Number			
	Concentrations in ug/kg			
	ST01 EJZ06	ST02 EZJ07	ST03 EJZ08	ST04 EJZ09
Phenol	460 U	480 U	590 U	520 U
bis(2-Chloroethyl)Ether	460 U	480 U	590 U	520 U
2-Chlorophenol	460 U	480 U	590 U	520 U
1,3-Dichlorobenzene	460 U	480 U	590 U	520 U
1,4-Dichlorobenzene	460 U	480 U	590 U	520 U
1,2-Dichlorobenzene	460 U	480 U	590 U	520 U
2-Methylphenol	460 U	480 U	590 U	520 U
2,2'-oxybis(1-Chloropropane)	460 U	480 U	590 U	520 U
4-Methylphenol	460 U	480 U	590 U	520 U
n-Nitroso-Di-n-Propylamine	460 U	480 U	590 U	520 U
Hexachloroethane	460 U	480 U	590 U	520 U
Nitrobenzene	460 UJ	480 UJ	590 UJ	520 UJ
Isophorone	460 U	480 U	590 U	520 U
2-Nitrophenol	460 U	480 U	590 U	520 U
2,4-Dimethylphenol	460 U	480 U	590 U	520 U
bis(2-Chloroethoxy)Methane	460 U	480 U	590 U	520 U
2,4-Dichlorophenol	460 U	480 U	590 U	520 U
1,2,4-Trichlorobenzene	460 U	480 U	590 U	520 U
Naphthalene	460 U	480 U	590 U	40 J
4-Chloroaniline	460 U	480 U	590 U	520 U
Hexachlorobutadiene	460 U	480 U	590 U	520 U
4-Chloro-3-Methylphenol	460 U	480 U	590 U	68 J
2-Methylnaphthalene	460 U	480 U	590 U	24 J
Hexachlorocyclopentadiene	460 UJ	480 UJ	590 UJ	520 UJ
2,4,6-Trichlorophenol	460 U	480 U	590 U	520 U
2,4,5-Trichlorophenol	1100 U	1200 U	1400 U	1200 U
2-Chloronaphthalene	460 U	480 U	590 U	520 U
2-Nitroaniline	1100 U	1200 U	1400 U	1200 U
Dimethyl Phthalate	460 U	480 U	590 U	520 U
Acenaphthylene	460 U	480 U	590 U	520 U

Semi-volatile Organic Analysis for Sediment
AMCA International

Semi-volatile Compound	Sample Location and Number			
	Concentrations in ug/kg			
	ST01 EJZ06	ST02 EZJ07	ST03 EJZ08	ST04 EJZ09
2,6-Dinitrotoluene	460 U	480 U	590 U	520 U
3-Nitroaniline	1100 U	1200 U	1400 U	1200 U
Acenaphthene	460 U	480 U	590 U	170 J
2,4-Dinitrophenol	1100 U	1200 U	1400 U	1200 U
4-Nitrophenol	1100 U	1200 U	1400 U	1200 U
Dibenzofuran	460 U	480 U	590 U	99 J
2,4-Dinitrotoluene	460 U	480 U	590 U	520 U
Diethylphthalate	52 J	480 U	48 J	520 U
4-Chlorophenyl-phenylether	460 U	480 U	590 U	520 U
Fluorene	460 U	480 U	590 U	220 J
4-Nitroaniline	1100 U	1200 U	1400 U	1200 U
4,6-Dinitro-2-Methylphenol	1100 U	1200 U	1400 U	1200 U
n-Nitrosodiphenylamine	460 U	480 U	590 U	520 U
4-Bromophenyl-phenylether	460 U	480 U	590 U	520 U
Hexachlorobenzene	460 U	480 U	590 U	520 U
Pentachlorophenol	1100 U	1200 U	1400 U	1200 U
Phenanthrene	34 J	13 J	180 J	2200
Anthracene	460 U	480 U	590 U	690
Carbazole	460 U	480 U	590 U	220 J
di-n-Butylphthalate	460 UJB	480 UJB	590 U	1200 UJB
Fluoranthene	30 J	16 J	260 J	2400
Pyrene	460 U	22 J	690	6600
Butylbenzylphthalate	460 U	480 U	590 U	670
3,3'-Dichlorobenzidine	460 U	480 U	590 U	520 U
Benzo(a)Anthracene	460 U	480 U	180 J	1900
Chrysene	460 U	20 J	250 J	2000
bis(2-Ethylhexyl)Phthalate	460 U	480 UJB	590 UJB	1200 UB
di-n-Octyl Phthalate	460 U	480 U	590 UJB	1200 UJB
Benzo(b)Fluoranthene	460 U	20 J	390 J	2800
Benzo(k)Fluoranthene	460 U	480 U	590 U	320 J
Benzo(a)Pyrene	460 U	57 J	340 J	1700
Indeno(1,2,3-cd)Pyrene	460 U	480 U	260 J	1600
Dibenzo(a,h)Anthracene	460 U	480 U	590 U	360 J
Benzo(g,h,i)Perylene	460 U	480 U	340 J	1800
Total Number of TICs*	9	21	22	20

* Number, not concentration, of tentatively identified compounds (TICs) found in each sample.

SEDSV

Pesticide/PCB Analysis for Sediment				
AMCA International				
Pesticide/PCB	Sample Location and Number			
	Concentrations in ug/kg			
	ST01 EJZ06	ST02 EJZ07	ST03 EJZ08	ST04 EJZ09
Alpha-BHC	2.4 UJ	2.5 U	30 U	2.6 U
Beta-BHC	2.4 UJ	2.5 U	30 U	2.6 U
Delta-BHC	2.4 UJ	2.5 U	30 U	2.6 U
Gamma-BHC (Lind.)	2.4 UJ	2.5 U	30 U	2.6 U
Heptachlor	2.4 UJ	2.5 U	30 U	2.6 U
Aldrin	2.4 UJ	2.5 U	30 U	2.6 U
Heptachlor Epoxide	2.4 UJ	2.5 U	30 U	2.6 U
Endosulfan I	2.4 UJ	2.5 U	30 U	2.6 U
Dieldrin	1.4 J	4.8 U	59 U	3.5 JP
4,4'-DDE	4.6 UJ	4.8 U	59 U	5.2 U
Endrin	4.6 UJ	4.8 U	59 U	5.2 U
Endosulfan II	1.8 JP	4.8 U	59 U	5.2 U
4,4'-DDD	4.6 UJ	4.8 U	59 U	5.2 U
Endosulfan Sulfate	4.6 UJ	4.8 U	59 U	4.8 JP
4,4'-DDT	4.6 UJ	4.8 U	59 U	6.0 P
Methoxychlor	24 UJ	2.4 UJ	300 U	26 U
Endrin Ketone	4.6 UJ	4.8 U	59 U	5.2 U
Endrin Aldehyde	4.6 UJ	4.8 U	59 U	5.2 U
Alpha-Chlordane	2.0 JP	2.8 P	940 PD	5.2 P
Gamma-Chlordane	2.4 UJ	0.62 JP	160	2.9 P
Toxaphene	240 UJ	250 U	3000 U	260 U
Aroclor-1016	46 UJ	48 U	590 U	52 U
Aroclor-1221	94 UJ	98 U	1200 U	100 U
Aroclor-1232	46 UJ	48 U	590 U	52 U
Aroclor-1242	46 UJ	48 U	590 U	52 U
Aroclor-1248	46 UJ	280	47000 PD	52 U
Aroclor-1254	46 JP	48 U	590 U	52 U
Aroclor-1260	46 UJ	48 U	590 U	52 U

* Can be used for qualitative use only.

pests

Inorganic Analysis for Sediment Samples AMCA International				
Metals and Cyanide	Sample Locations and Number Concentrations in mg/kg			
	ST01 MEJJ83	ST02 MEJJ84	ST03 MEJJ85	ST04 MEJJ 86
Aluminum	12700	13200	12800	12800
Antimony	3.0 U	3.1 U	3.7 U	3.7 U
Arsenic	7.6 *	2.5 B*	5.9 *	3.6 *
Barium	49.1 B	190	117	828
Beryllium	0.64 B	0.64 B	0.70 B	0.64 B
Cadmium	1.4 U	1.4 U	33.3	1.7
Calcium	13000	2720	8220	78800
Chromium	24.1	18.6	823	61.9
Cobalt	14.4	8.6 B	11.3 B	4.9 B
Copper	22.6	15.0	74.3	69.5
Iron	21900	15300	20300	27800
Lead	28.6	38.0 S	67.4 J+	20.0 US
Magnesium	10300	3260	6080	44700
Manganese	532	186	322	691
Mercury	0.14 U	0.14 U	0.20	0.23
Nickel	30.7	17.4	25.2	19.9
Potassium	2340	1970	1840	1220 B
Selenium	0.81 UJNW	0.85 UJNW	1.00 UJNW	1.00 UJN
Silver	0.81 U	0.85	1.00 U	1.00 U
Sodium	1620	1940	2310	3340
Thallium	0.81	0.85 U	1.00 U	1.00 U
Vanadium	22.0	23.9	24.1	27.7
Zinc	458	73.9	398	281
Cyanide	0.68 U	0.71 U	3.1 J	0.83 U

sediments

Volatile Organic Analysis for Sediment
Tentatively Identified Compounds
AMCA International

ST01 (EJZ06)

Compound Name	Retention Time	Estimated Concentration (ug/kg)
Unknown Isomer of Methyl Naphthalene	23.330	20 J
Biphenylene	23.660	14 JN
Unknown Isomer of Methyl Naphthalene	24.270	31 J
Unknown PAH	25.420	13 J
1,1'-Biphenyl	26.390	15 JN
Unknown Isomer of Methyl Naphthalene	27.280	15 J
Unknown Isomer of Dimethyl Naphthalene	27.800	34 J

ST03 (EJZ08)

Compound Name	Retention Time	Estimated Concentration (ug/kg)
Unknown	23.160	17 J
Unknown PAH	23.610	28 J
Unknown Cycloalkane	24.900	20 J
Unknown Branched Alkane	25.010	14 J
Unknown Cycloalkane	25.290	22 J
Naphthalene, Decahydro-2-methyl	25.840	28 JN
Unknown Alkane	26.780	33 J
Unknown	26.950	25 J
Unknown Alkene	27.500	15 J
Unknown Alkane	27.720	35 J

ST04 (EJZ09)

Compound Name	Retention Time	Estimated Concentration (ug/kg)
Biphenylene	23.680	8 JN
Unknown PAH	25.510	18 J
Unknown	27.160	16 J
Unknown PAH	27.770	15 J
Unknown Isomer of Dimethyl N	27.910	8 J

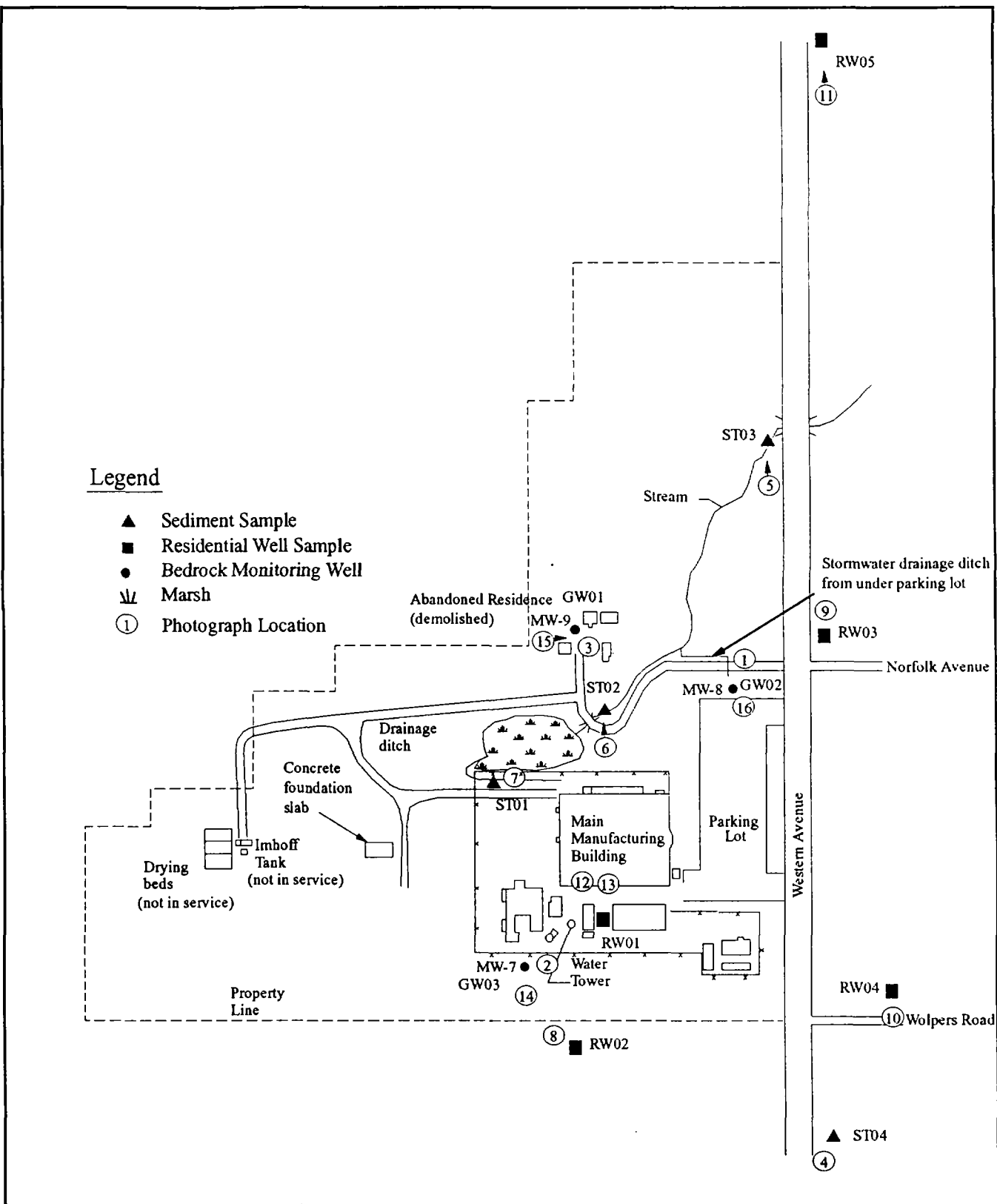
11/15/04

Semi-volatile Organic Analysis for Sediment Tentatively Identified Compounds AMCA International		
ST01 (EJZ06)		
Compound Name	Retention Time	Estimated Concentration (ug/kg)
Unknown	3.600	1500 UJB
Aldol Condensation Product	5.040	66000 UJAB
Unknown	6.430	1400 UJB
Unknown	8.480	210 UJB
Unknown	9.160	170 UJB
Unknown Alkane	9.340	170 UJ
Unknown Alkane	9.580	97 UJ
Unknown	11.640	220 UJB
Unknown Alkane	17.770	210 UJ
ST02 (EJZ07)		
Compound Name	Retention Time	Estimated Concentration (ug/kg)
Unknown	3.650	840 UJB
Aldol Condensation Product	4.790	35000 UJAB
Unknown	6.360	190 UJB
Unknown	6.520	2600 UJB
Unknown	6.780	170 UJB
Unknown	8.210	140 J
Unknown	8.490	310 UJB
Unknown	9.330	190 J
Unknown	11.630	320 J
Unknown Alkane	24.350	170 J
Unknown	26.030	460 J
Unknown Alkane	26.830	140 J
Unknown Alkane	27.590	580 J
Unknown Alkane	28.330	150 J
Unknown	28.660	380 J
Unknown Alkane	29.050	590 J
Unknown	29.110	250 J
Unknown Alkane	30.650	660 J
Unknown	32.880	410 J
Unknown	33.230	130 J
Unknown	33.970	210 J
ST03 (EJZ08)		
Compound Name	Retention Time	Estimated Concentration (ug/kg)
Unknown	3.500	1400 UJB
Aldol Condensation Product	4.450	35000 UJAB
Aldol Condensation Product	5.030	97000 UJAB
Unknown	6.330	3400 UJB
Unknown	11.500	390 UJB
Unknown	14.890	680 J
Unknown Alkane	15.300	530 J
Unknown	15.940	360 J
Unknown	16.260	410 J
Unknown	16.490	610 J
Unknown	16.630	550 J
Unknown Alkane	17.060	330 J
Unknown Alkane	17.640	1900 J
Unknown Alkane	18.320	2700 J
Unknown	18.730	760 J
Unknown Trichlorobiphenyl isomer	20.420	1600 J
Unknown Tetrachlorobiphenyl	20.600	390 J
Unknown Tetrachlorobiphenyl	21.120	960 J
Unknown Tetrachlorobiphenyl	21.200	1700 J
Unknown Tetrachlorobiphenyl	21.550	960 J
Unknown Tetrachlorobiphenyl	21.610	630 J
Unknown Tetrachlorobiphenyl	21.800	1400 J
ST04 (EJZ09)		
Compound Name	Retention Time	Estimated Concentration (ug/kg)
Unknown	3.500	2800 UJB
Aldol Condensation Product	4.330	16000 UJAB
Unknown	6.180	180 UJB
Unknown	6.310	2300 UJB
Unknown	6.590	190 UJB
Unknown	7.490	280 J
Unknown	8.080	290 J
Unknown	8.340	240 UJB
Unknown	9.140	280 J
Acetophenone	9.360	220 JN
Unknown	11.500	320 UJB
Unknown	18.590	240 J
[2,2]Paracyclophane	18.980	620 JN
Unknown	20.860	280 J
Unknown	21.110	210 J
Unknown	25.690	1000 J
Unknown Acid	26.510	800 J
Unknown Acid	26.610	1500 J
Unknown Alkane	30.370	1000 J
Unknown	31.340	1200 J

Appendix D

AMCA International Corp.
(a.k.a. Continental-Midland, Inc.)

Site Photographs



Source: ERM Remedial Investigation, 1988

Not to Scale

N



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D-1

Figure D-1
Photo Location Map

AMCA International
(A.K.A. Continental Midland, Inc.)

Photo Map Number 1

Date: 08/23/93

Time: 1235

Photo Taken By: D. D. Ingram

Photo Number: 7, Roll 1

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: --

Description: Core from MW-8A, 115' - 131.3'.
Wood blocks indicate core runs.



Photo Map Number 2

Date: 08/28/93

Time: 1200

Photo Taken By: S. R. Mrkvicka

Photo Number: 11, Roll 1

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: --

Description: Core from MW-7, 122'-137'.
Top of core at upper right corner.



Photo Map Number 3

Date: 08/30/93

Time: 1515

Photo Taken By: J. P. Chitwood

Photo Number: 13, Roll 1

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: --

Description: Core from MW-9A, 118.5' - 134'.
Top of core at upper left corner.



Photo Map Number 4

Date: 08/30/93

Time: 1235

Photo Taken By: R. J. Reints

Photo Number: 1, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: Northeast

Description: ST04 sampling location. 300 feet
south of site at a culvert passing under
Western Ave.



Photo Map Number 5

Date: 08/30/93

Time: 1250

Photo Taken By: R. J. Reints

Photo Number: 3, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: Northwest

Description: ST03 sampling location. 300 feet north of site. The stream exits the site under Western Ave. at this point.



Photo Map Number 6

Date: 08/30/93

Time: 1345

Photo Taken By: R. J. Reints

Photo Number: 5, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: North

Description: ST02 sampling location. At the stream exiting the wetland north of the facility building.



Photo Map Number 7

Date: 08/30/93

Time: 1430

Photo Taken By: R. J. Reints

Photo Number: 7, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: Northwest

Description: ST01 sampling location. At the ditch which drains the parking lot west of the facility buildings and inside (east) of the fence.



Photo Map Number 8

Date: 08/31/93

Time: 0945

Photo Taken By: R. J. Reints

Photo Number: 11, roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: Southeast

Description: RW02 sampling location. Residence located south of the site. Placard depicting sample number in photograph is mislabelled.



Photo Map Location 9

Date: 08/31/93

Time: 1055

Photo Taken By: R. J. Reints

Photo Number: 13, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: South

Description: RW03 sampling location.
Residence northeast of the site.



Photo Map Number 10

Date: 08/31/93

Time: 1620

Photo Taken By: R. J. Reints

Photo Number: 15, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: North

Description: RW04 sampling location.
Residence southeast of the site, next to the greenhouse.



Photo Map Number 11

Date: 08/31/93

Time: 1650

Photo Taken By: R. J. Reints

Photo Number: 17, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: North

Description: RW05 sampling location.
Residence north of site.



Photo Map Number 12

Date: 09/02/93

Time: 1437

Photo Taken By: R. J. Reints

Photo Number: 19, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: South

Description: Plant well being evacuated.



Photo Map Number 13

Date: 09/02/93

Time: 1445

Photo Taken By: R. J. Reints

Photo Number: 20, roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: South

Description: RW01 sample location, inside facility.



Photo Map Number 14

Date: 09/02/93

Time: 1445

Photo Taken By: R. J. Reints

Photo Number: 22, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: Northeast

Description: GW03 sample location which is MW-7, south of facility.



Photo Map Number 15

Date: 09/02/93

Time: 1600

Photo Taken By: R. J. Reints

Photo Number: 24, Roll 2

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: East

Description: GW01 sample location which is MW-9, north of the facility.



Photo Map Number 16

Date: 09/02/93

Time: 1705

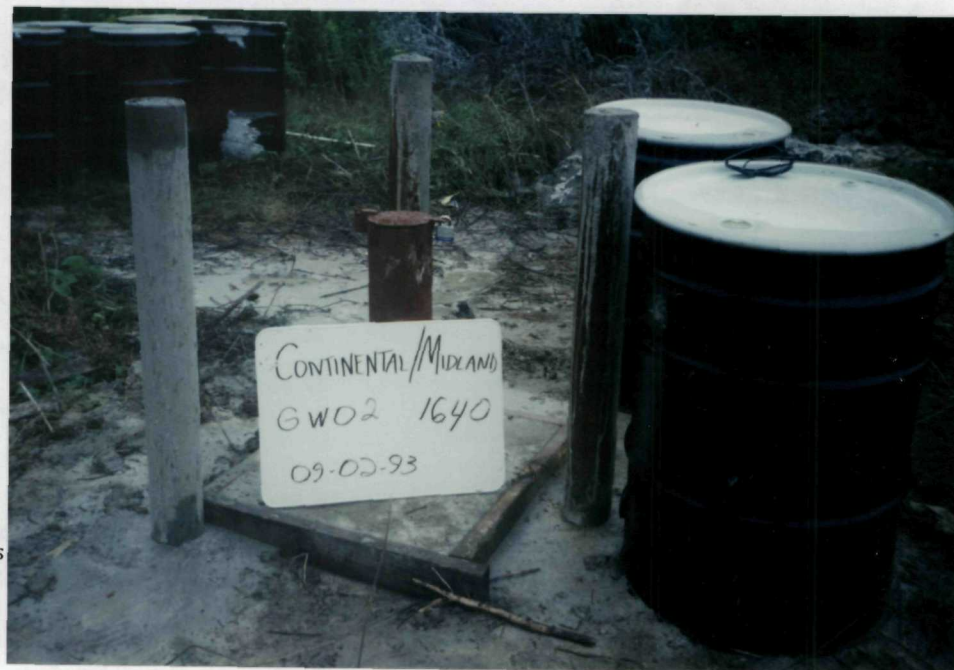
Photo Taken By: R. J. Reints

Photo Number: 2, Roll 3

Location/ILD #: AMCA
International/ILD 051 069 854

Direction of Photo: Northeast

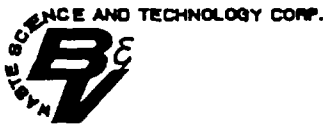
Description: GW02 sampling location which is MW-8, northeast of the facility.



Appendix E

AMCA International Corp.
(a.k.a. Continental-Midland, Inc.)

Boring and Well Installation Logs



LOG OF BORING

BORING NO. MW-7
SHEET 1 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed		ELEVATION (DATUM) 400.12' relative	TOTAL DEPTH 137 FEET
SURFACE CONDITIONS Along south fenceline near water tower		LOGGED BY S. Mrkvicka		DATE START 08/3/93
				DATE FINISH 08/28/93

SAMPLING							CHECKED BY R. Sutera			APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING											
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD					
SPT	1	10	15	21	36	2.0	1			Silty CLAY; grayish-brown; stiff; low plasticity; w/some sand.	Boring advanced w/10-1/4" OD, 6-1/4" ID hollow stem auger.
							2				
							3				
							4				
							5				
							6				
							7				
							8				
							9				
							10				
SPT	2	8	15	20	35	2.0	11				
							12				
							13				
							14				
SPT	3	6	10	18	28	2.0	15				
							16				
							17				
							18				
							19				
SPT	4	7	14	20	34	2.0	20				
							21				
							22				
							23				
							24				
SPT	5	9	17	30	47	1.8	25				
							26				
							27				
							28				
							29				

grading moist

Silty SAND; brown; medium dense; poorly graded; medium grained; subrounded; wet; w/some clay.

Water encountered @ ~25' during drilling.



LOG OF BORING

BORING NO. MW-7
SHEET 2 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed	ELEVATION (DATUM) 400.12' relative	TOTAL DEPTH 137 FEET	DATE START 08/3/93
SURFACE CONDITIONS Along south fenceline near water tower		LOGGED BY S. Mrkvicka		DATE FINISH 08/28/93

SAMPLING							CHECKED BY R. Sutura		APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	REMARKS
CORING										
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD				
SPT	6	7	6	9	15	2.0	31			Sandy SILT; gray; stiff; low plasticity; wet; w/some clay (glacial till).
							32			
							33			
							34			
							35			
SPT	7	13	8	9	17	1.5	36			SAND; brown, w/black laminations; loose; dry.
							37			
							38			
							39			
SPT	8	7	38	70	108	1.8	40			CLAY; gray-brown; stiff; low plasticity; moist; w/some sand.
							41			
							42			
							43			
SPT	9	31	29	45	74	1.3	45			Sandy GRAVEL; light gray; very dense; dry; poorly graded; angular
							46			
							47			
							48			
SPT	10	62	59	58	117	1.5	50			
							51			
							52			
							53			
SPT	11	11	17	21	38	1.8	55			Sandy SILT; dark gray; hard; dry; trace sand and clay.
							56			
							57			
							58			
							59			

Temporary 8" ID steel casing driven to 58'.
Below 55', boring continued w/7-7/8" tricone bit using bentonite mud as drilling fluid.



LOG OF BORING

BORING NO. MW-7
SHEET 3 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed	ELEVATION (DATUM) 400.12' relative	TOTAL DEPTH 137 FEET	DATE START 08/3/93
SURFACE CONDITIONS Along south fenceline near water tower		LOGGED BY S. Mrkvicka		DATE FINISH 08/28/93

SAMPLING							CHECKED BY R. Sutera			APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING											
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
SPT	12	44	71	65	136	0.0	61				
							62				
							63				
							64				
SPT	13	10	32	16	48	1.3	65			Silty CLAY; gray; hard; high plasticity; moist; trace sand (glacial till).	
							66				
							67				
							68				
							69				
SPT	14	9	24	45	69	1.2	70			Sandy SILT; gray; hard; moist; w/thin black clay laminae @ ~ 40'	
							71				
							72				
							73				
							74				
SPT	15	8	20	31	51	1.2	75				
							76				
							77				
							78				
							79				
SPT	16	9	39	37	76	1.2	80				
							81			@ ~81', grading wet; poorly graded.	
							82				
							83				
							84				
SPT	17	15	28	44	72	1.2	85			Silty CLAY; gray; hard; high plasticity; moist; trace sand (glacial till).	
							86				Shale, limestone fragments in till.
							87			SAND; gray medium dense; well graded; fine grained; wet.	
							88				
							89				











Shale, limestone fragments in till.



LOG OF BORING

BORING NO. MW-7
SHEET 4 OF 5

CLIENT USEPA Region V			PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed		ELEVATION (DATUM) 400.12' relative	TOTAL DEPTH 137 FEET	DATE START 08/3/93
SURFACE CONDITIONS Along south fenceline near water tower			LOGGED BY S. Mrkvicka		DATE FINISH 08/28/93


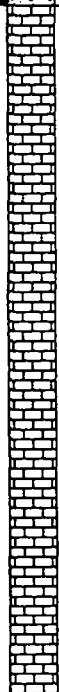
SAMPLING							CHECKED BY R. Sutera			APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING											
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
SPT	18	14	33	60	93	1.2	91	▲		SAND; brown; very dense; poorly graded; fine grained; weak cementation; wet.	
							92			GRAVEL; gray; very dense; well graded; subangular wet; w/dark gray shale fragments.	
							93				
							94				
SPT	19	95	97	100/5"	-	1.4	95	▲			
							96	▲			
							97			SAND; brown; very dense; poorly graded; fine grained; weak cementation; wet.	
							98				
							99				
SPT	20	28	40	65	105	1.7	100	▲		Sandy SILT; brown; hard; low plasticity; moist; trace gravel.	
							101	▲			
							102	▲			
							103			SILT; brown; hard; low plasticity; w/some gravel.	
							104				
SPT	21	11	17	19	36	2.0	105	▲			
							106	▲			
							107	▲			
							108				
							109				
SPT	22	7	18	27	45	1.8	110	▲			
							111	▲			
							112	▲		Silty SAND; brown; loose; well graded; trace gravel.	
							113				
							114				
SPT	23	5	11	14	25	2.0	115	▲		SILT; brown; very stiff; low plasticity; moist; w/some gravel.	
							116	▲			
							117	▲			
							118				
							119				



LOG OF BORING

BORING NO. MW-7
SHEET 5 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois		COORDINATES Not surveyed	ELEVATION (DATUM) 400.12' relative	TOTAL DEPTH 137 FEET
SURFACE CONDITIONS Along south fenceline near water tower			LOGGED BY S. Mrkvicka	DATE START 08/3/93
			APPROVED BY J. Chitwood	DATE FINISH 08/28/93

SAMPLING							CHECKED BY R. Sutura			APPROVED BY J. Chitwood		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORING												
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD						
SPT	24	160	-	-	-	0.4	121			Silty GRAVEL; loose; poorly graded; 1/8" to 1"; subangular; wet.		
			122'				122			LIMESTONE; argillaceous; gray to light gray; finely crystalline; vugs < 20%, up to 0.1"; trace partings, up to 0.1".	4" PVC casing set and grouted to 122'. Below 122', boring continued w/NX double core barrel w/diamond bit using potable water as drilling fluid. Below 122', boring reamed w/3-7/8" OD tricone bit using potable water as drilling fluid.	
2 1/4"	1	10.0'	10.0'	0.0	100	0.0	123					
							124					
							125					
							126					
							127					
							128					
							129					
							130					
							131					
			132'				132					
							133			trace calcite and pyrite in vugs		
2 1/4"	2	5.0'	5.0'	1.7	100	3.4	134					
							135					
							136					
			137'				137					
							138				Bottom of boring @ 137'.	
							139				Water level not recorded.	
							140				Monitoring well installed on 8/30/93.	
							141					
							142					
							143					
							144					
							145					
							146					
							147					
							148					
							149					



LOG OF BORING

BORING NO. MW-8
SHEET 2 OF 2

CLIENT USEPA Region V			PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois		COORDINATES Not surveyed		ELEVATION (DATUM) 391.22' relative	TOTAL DEPTH 57 FEET
SURFACE CONDITIONS Flat, grassy			LOGGED BY D. Ingram		DATE FINISH 08/17/93

SAMPLING							CHECKED BY R. Sutera		APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	REMARKS
CORING										
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD				
SPT	6	2	5	8	13	1.9	31			
							32			
							33			
							34			
SPT	7	9	14	18	32	2.0	35			
							36			
							37			
							38			
							39			
SPT	8	5	10	11	21	1.6	40			Silty SAND; gray; medium dense; fine to medium grained; subrounded to rounded; wet.
							41			
							42			Clayey SILT; gray; stiff; low plasticity; moist; trace sand.
							43			
							44			
SPT	9	8	10	30	40	0.9	45			Sandy SILT; gray; hard; moist; trace gravel.
							46			
							47			
							48			
							49			Some clay grades in.
SPT	10	8	48	28	76	1.2	50			
							51			Silty SAND; gray; coarse grained; very dense; well graded; w/some gravel.
							52			
							53			
							54			
SPT	11	11	12	23	35	1.5	55			SAND; light brown; dense; poorly graded; fine grained; moist.
							56			
							57			Bottom of boring @ 57'.
										Water level not recorded.
										Boring backfilled w/cement-bentonite grout to ground surface on 8/17/93.
							58			
							59			

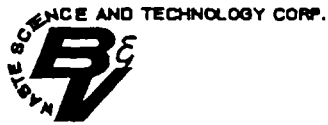


LOG OF BORING

BORING NO. MW-8A
SHEET 2 OF 5

CLIENT USEPA Region V			PROJECT Continental-Midland		PROJECT NO. 70720.143	
PROJECT LOCATION Park Forest, Illinois		COORDINATES Not surveyed		ELEVATION (DATUM) 391.22' (relative)	TOTAL DEPTH 131.3 FEET	DATE START 08/17/93
SURFACE CONDITIONS Flat, grassy.			LOGGED BY D. Ingram			DATE FINISH 08/23/93

SAMPLING							CHECKED BY R. Sutera			APPROVED BY J. Chitwood		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORING												
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD						
SPT	1	-	-	-	-	1.3	31					
							32					
							33					
							34					
							35					
							36					
							37					
							38					
							39					
							40					
							41			Silty SAND; gray; medium dense; fine to coarse grained; subrounded to rounded; wet; w/some clay.		
							42			Clayey SILT; gray to dark brown; stiff; low plasticity; moist; w/some sand.		
							43				Temporary 8" steel casing driven to 43'.	
							44			Silty GRAVEL; light brown to dark gray; medium dense; subrounded to subangular; wet; trace sand.		
SPT	2	10	9	10	19	2.0	45				Below 43' boring continued w/7 7/8" diameter tricone bit using bentonite mud as drilling fluid.	
							46			SILT; dark brown; dense; low plasticity; moist; trace sand and gravel.		
							47					
							48					
							49					
SPT	3	21	26	37	63	1.7	50			SAND; yellowish-brown; very dense; poorly graded; fine grained; moist.		
							51					
							52					
							53					
							54					
SPT	4	37	47	51	98	1.5	55			Grading wet, trace gravel.		
							56					
							57					
							58					
							59					



LOG OF BORING

BORING NO. MW-8A
SHEET 3 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed		ELEVATION (DATUM) 391.22' (relative)	TOTAL DEPTH 131.3 FEET
SURFACE CONDITIONS Flat, grassy.		LOGGED BY D. Ingram		DATE START 08/17/93
				DATE FINISH 08/23/93

SAMPLING							CHECKED BY R. Sutera			APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING							DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
SPT	5	20	40	61	101	1.4	61			Gravel grades out; occasional sand lamination grades in.	
							62				
							63				
							64				
SPT	6	37	67	86	153	1.2	65				
							66				
							67				
							68				
							69				
SPT	7	46	67	-	-	1.0	70			Trace silt grades in.	
							71				
							72				
							73				
							74				
SPT	8	50	67	-	-	1.1	75			Silt grades out.	
							76				
							77				
							78				
							79				
SPT	9	21	37	41	78	0.8	80				
							81				
							82				
							83				
							84				
SPT	10	41	67	100	167	0.9	85				
							86				
							87				
							88				
							89			Sandy GRAVEL; dark gray; dense; well graded; subangular; wet; w/some silt.	



LOG OF BORING

BORING NO. MW-8A
SHEET 4 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed		ELEVATION (DATUM) 391.22' (relative)	TOTAL DEPTH 131.3 FEET
SURFACE CONDITIONS Flat, grassy.		LOGGED BY D. Ingram		
		DATE FINISH 08/23/93		

SAMPLING							CHECKED BY R. Sutera		APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 8 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	REMARKS
CORING										
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD				
SPT	11	26	21	16	37	1.0	91			Silty SAND; brown; medium dense; poorly graded; fine grained; rounded; wet.
							92			
							93			
							94			
SPT	12	31	29	34	63	1.7	95			
							96			
							97			
							98			
							99			
SPT	13	38	38	38	76	1.7	100			
							101			
							102			
							103			
							104			
SPT	14	28	30	39	69	1.6	105			
							106			
							107			
							108			
							109			
SPT	15	26	26	26	52	0.9	110			Gravelly SILT; grayish-brown; hard; wet; trace sand.
							111			
							112			
							113			
							114			
							115			
			115'				116			
2 1/4"	1	3.2'	3.2'	0'	100	0	117			
							118			
							119			

LIMESTONE; argillaceous; light gray to gray; thin to medium bedded; finely crystalline; vugs <25%, 1/4" to 1"; moderately weathered; trace pyrite.

4" PVC casing set and grouted to 115'.



Below 115' boring continued w/NX double core barrel w/ diamond bit and reamed w/3 7/8" diameter tricone bit using potable water as drilling fluid.



LOG OF BORING

BORING NO. MW-8A
SHEET 5 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143	
PROJECT LOCATION Park Forest, Illinois		COORDINATES Not surveyed		ELEVATION (DATUM) 391.22' (relative)	TOTAL DEPTH 131.3 FEET
SURFACE CONDITIONS Flat, grassy.				LOGGED BY D. Ingram	DATE FINISHED 08/23/93

SAMPLING							CHECKED BY R. Sutera			APPROVED BY J. Chitwood		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORING												
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD						
2 1/4"	2	6.1'	6.1'	0'	100	0	121		6" vertical fracture lined w/ calcite and pyrite @ ~121.1'.			
							122					
							123					
			124.3'				124					
							125					
							126					
							127					
2 1/4"	3	7.0'	7.0'	1.8'	100	25.7	128					
							129					
							130					
			131.3'				131		Pyrite-filled vertical fractures @ 129.5'			
							132					
							133					
							134					
							135					
							136					
							137					
							138					
							139					
							140					
							141					
							142					
							143					
							144					
							145					
							146					
							147					
							148					
							149					



LOG OF BORING

BORING NO. MW-9
SHEET 1 OF 3

CLIENT USEPA Region V			PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed		ELEVATION (DATUM) 397.65' (relative)	TOTAL DEPTH 77 FEET	DATE START 08/14/93
SURFACE CONDITIONS Grassy; slightly sloping to the south			LOGGED BY D. Ingram		DATE FINISH 08/15/93

SAMPLING							CHECKED BY R. Sutera			APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING							DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
SPT	1	4	11	16	27	1.9	1			Silty CLAY; grayish-brown; very stiff; low plasticity; trace gravel and occasional iron staining.	Boring advanced w/10-1/4" OD, 6-1/4" ID hollow stem auger.
							2				
							3				
							4				
							5				
							6				
							7				
							8				
							9				
							10			Grading moist.	
							11				
							12				
							13				
							14				
							15			Grading reddish-brown; stiff; high plasticity.	
							16				
							17				
							18				
							19			Grading brown.	
							20				
							21				
							22				
							23				
							24			Trace sand grades in.	
							25				
							26				
							27			Silty SAND; reddish-brown; poorly graded; fine grained; subrounded; moist.	
							28				
							29				



LOG OF BORING

BORING NO. MW-9
SHEET 2 OF 3

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed		ELEVATION (DATUM) 397.65' (relative)	TOTAL DEPTH 77 FEET
SURFACE CONDITIONS Grassy; slightly sloping to the south			LOGGED BY D. Ingram	DATE FINISH 08/15/93

SAMPLING							CHECKED BY R. Sutura			APPROVED BY J. Chitwood	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING											
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
SPT	6	28	100/3	-	-	0.7	31			Grading very dense; well graded; fine to coarse grained; dry.	
							32				
							33				
							34				
SPT	7	20	70	94	164	1.9	35			Some gravel grades in.	
							36				
							37				
							38				
							39			Grading moist, gravel grades to trace.	
SPT	8	18	25	32	57	2.0	40				
							41			SAND; light brown; very dense; poorly graded; fine grained; moist; trace gravel and silt.	
							42				
							43				
							44				
SPT	9	9	18	27	45	2.0	45				
							46				
							47				
							48				
							49				
SPT	10	4	19	27	46	2.0	50				
							51				
							52				
							53				
							54				
SPT	11	20	22	29	51	1.7	55				
							56				
							57				
							58				
							59				



LOG OF BORING

BORING NO. MW-9
SHEET 3 OF 3

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois		COORDINATES Not surveyed	ELEVATION (DATUM) 397.65' (relative)	TOTAL DEPTH 77 FEET
SURFACE CONDITIONS Grassy; slightly sloping to the south			LOGGED BY D. Ingram	DATE FINISH 08/15/93

SAMPLING							CHECKED BY R. Sutura			APPROVED BY J. Chitwood		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORING												
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD						
SPT	12	8	11	34	45	1.7	61	▲		Grading wet.	Water encountered @ ~69.5' during drilling.	
							62					
							63					
							64					
SPT	13	12	25	42	67	1.8	65	▲				
							66	▲				
							67					
							68					
							69					
SPT	14	9	17	20	37	2.0	70	▲				
							71	▲				
							72	▲				
							73					
							74					
SPT	15	3	7	9	16	1.8	75	▲				
			77'				76	▲				
							77	▲				
							78			Bottom of boring @ 77'.		
							79			Water level not recorded.		
							80			Boring backfilled w/grout to surface on 8/27/93.		
							81					
							82					
							83					
							84					
							85					
							86					
							87					
							88					
							89					



LOG OF BORING

BORING NO. MW-9A
SHEET 1 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois		COORDINATES Not surveyed	ELEVATION (DATUM) 397.65' (relative)	TOTAL DEPTH 135 FEET
SURFACE CONDITIONS Flat, open, weed-covered.			LOGGED BY D. Ingram	DATE FINISH 08/28/93

SAMPLING							CHECKED BY R. Sutera		APPROVED BY J. Chitwood		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
							1			Undifferentiated overburden (See log of boring for MW-9).	Boring advanced w/10-1/4" OD, 6-1/4" ID hollow stem auger to 7'. Set 8" temporary steel casing to 8.5'. Below 7' boring continued w/7 7/8" diameter tricone bit using potable water as drilling fluid.
							2				
							3				
							4				
							5				
							6				
							7				
							8				
							9				
							10				
							11				
							12				
							13				
							14				
							15				
							16				
							17				
							18				
							19				
							20				
							21				
							22				
							23				
							24				
							25				
							26				
							27				
							28				
							29				



LOG OF BORING

BORING NO. MW-9A
SHEET 2 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois		COORDINATES Not surveyed	ELEVATION (DATUM) 397.65' (relative)	TOTAL DEPTH 135 FEET
SURFACE CONDITIONS Flat, open, weed-covered.			LOGGED BY D. Ingram	DATE START 08/25/93

SAMPLING							CHECKED BY R. Sutera		APPROVED BY J. Chitwood		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING											
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RSD RECOVERY	PERCENT RECOVERY	RSD					
							31				
							32				
							33				
							34				
							35				
							36				
							37				
							38				
							39				
							40				
							41				
							42				
							43				
							44				
							45				
							46				
							47				
							48				
							49				
							50				
							51				
							52				
							53				
							54				
							55				
							56				
							57				
							58				
							59				



LOG OF BORING

BORING NO. MW-9A
SHEET 3 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois		COORDINATES Not surveyed	ELEVATION (DATUM) 397.65' (relative)	TOTAL DEPTH 135 FEET
SURFACE CONDITIONS Flat, open, weed-covered.			LOGGED BY D. Ingram	DATE FINISH 08/28/93

SAMPLING							CHECKED BY R. Sutera		APPROVED BY J. Chitwood		
SAMPLE TYPE	SAMPLE NUMBER	SET 0 INCHES	2ND 0 INCHES	3RD 0 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING											
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
SPT	1	26	39	41	80	1.4	61				
							62				
							63				
							64				
							65				
							66				
							67				
							68				
							69				
							70				
SPT	2	7	12	18	30	1.6	71				
							72				
							73				
							74				
							75				
							76				
							77				
							78				
							79				
							80				
SPT	3	37	49	58	107	1.3	81				
							82				
							83				
							84				
							85				
							86				
							87				
							88				
							89				



LOG OF BORING

BORING NO. MW-9A
SHEET 4 OF 5

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed		ELEVATION (DATUM) 397.65' (relative)	TOTAL DEPTH 135 FEET
SURFACE CONDITIONS Flat, open, weed-covered.		LOGGED BY D. Ingram		DATE FINISH 08/28/93

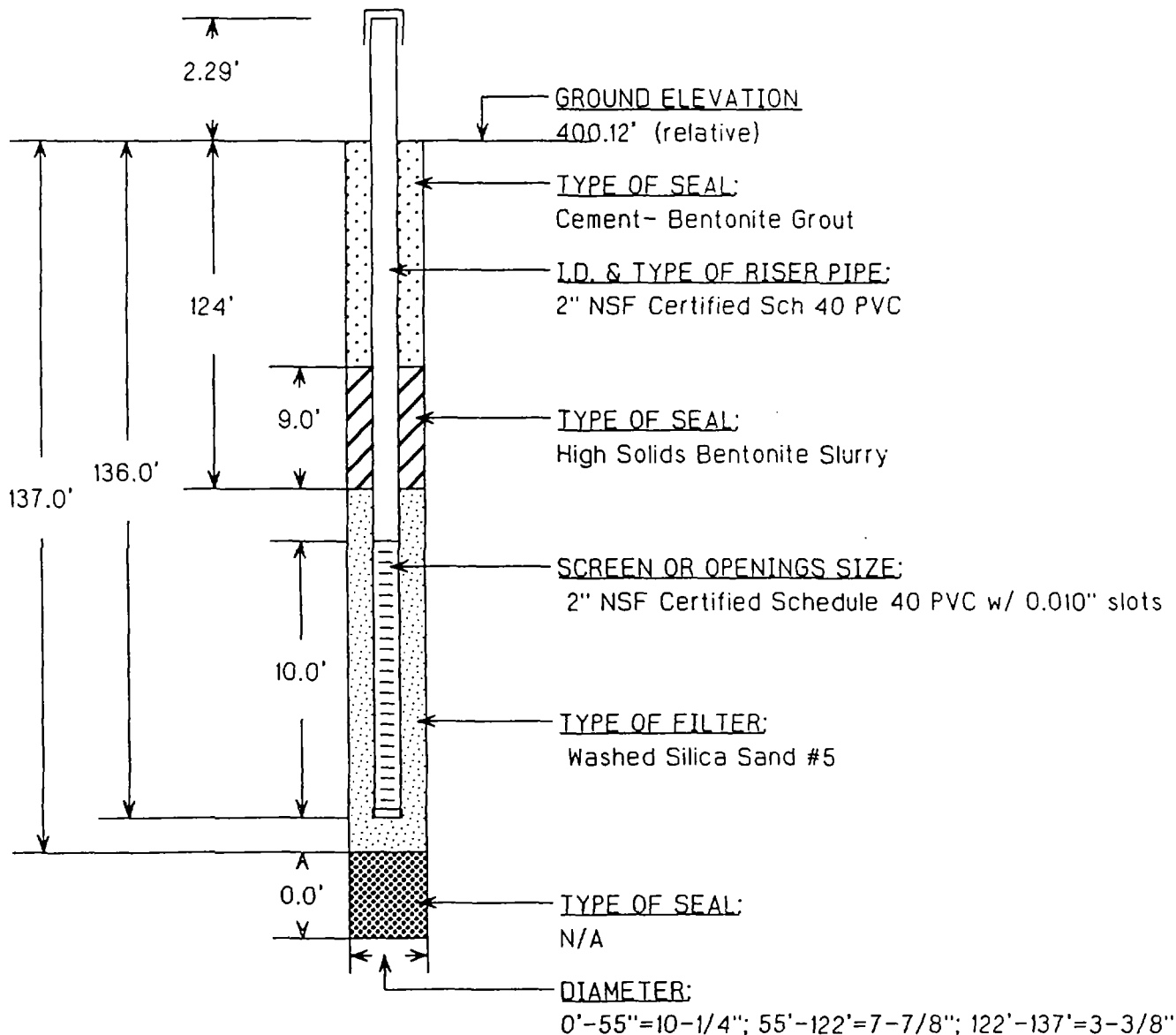
SAMPLING							CHECKED BY R. Sutera			APPROVED BY J. Chitwood		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORING												
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD						
SPT	4	17	31	47	78	1.4	91			Sandy SILT; gray; hard; low plasticity; moist.		
							92			SAND; dark gray; very dense; poorly graded; fine to medium grained; rounded; wet.		
							93					
							94					
SPT	5	35	38	35	73	1.3	95			Gravelly SAND; tan to gray, very dense; well graded; fine to medium grained; rounded to subangular; wet; trace clay and silt.		
							96					
							97			SAND; tan to gray; dense; poorly graded; fine grained; rounded; wet; w/some silt.		
							98					
							99					
SPT	6	30	42	80	122	1.3	100			Grading very dense.		
							101					
							102					
							103					
							104					
SPT	7	31	41	54	95	1.1	105			Silt grades to trace.		
							106					
							107					
							108					
							109					
SPT	8	16	30	34	64	1.2	110			Grading to fine to medium grained.		
							111					
							112			SILT; gray to dark gray; very hard; low plasticity; moist trace sand.		
							113					
							114					
SPT	9	17	19	25	44	0.6	115			Gravelly SILT; gray; hard; high plasticity; moist; w/some sand.		
							116					
							117					
			117.5'				118			LIMESTONE; argillaceous; gray; laminated; trace vugs, pinpoint to 3/8"; fresh.	4" diameter Sch 40 PVC casing set and grouted to 118.5'.	
							119					



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-7

CLIENT USEPA Region V		PROJECT Continental-Midland	PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed	TOP OF RISER ELEVATION (DATUM) 402.41' (relative)	DATE 8/30/93
STRATUM MONITORED Limestone		LOGGED BY J. Chitwood	
CHECKED BY R. Sutera		APPROVED BY J. Chitwood	



METHOD OF INSTALLATION:

Boring drilled to completion; set riser pipe and screen; placed filter and seal. Grouted to 2' below ground surface. Set above-ground protective steel casing. Concrete surface seal placed 6" above ground surface.

REMARKS:

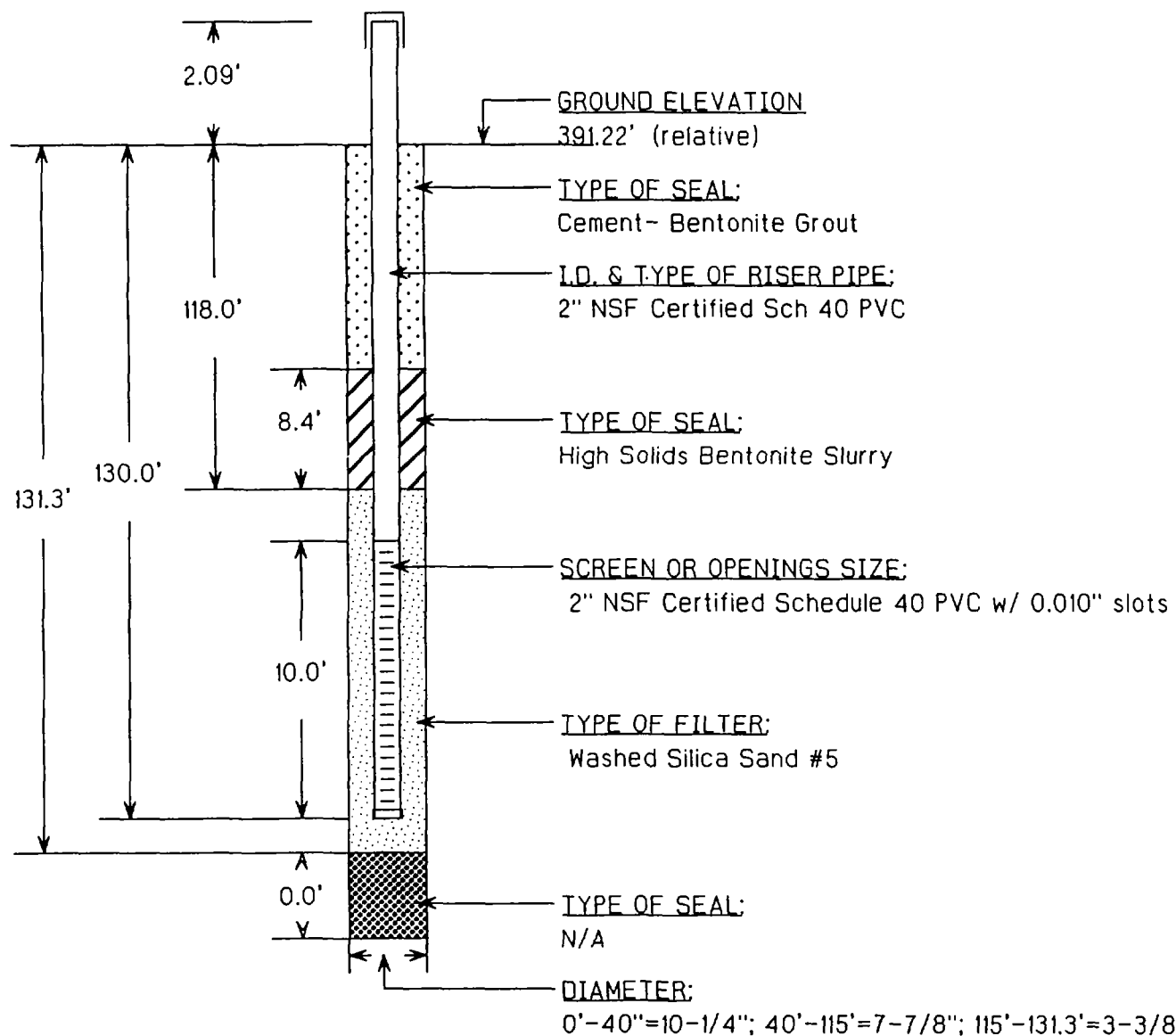
Well pumped dry during development.



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-8

CLIENT USEPA Region V		PROJECT Continental-Midland		PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed	TOP OF RISER ELEVATION (DATUM) 393.31' (relative)		DATE 8/24/93
STRATUM MONITORED Limestone			LOGGED BY D. Ingram	
CHECKED BY R. Sutera			APPROVED BY J. Chitwood	

**METHOD OF INSTALLATION:**

Boring drilled to completion; set riser pipe and screen; placed filter and seal. Grouted to 2' below ground surface. Set above ground protective steel casing. Concrete surface seal placed 6" above ground surface.

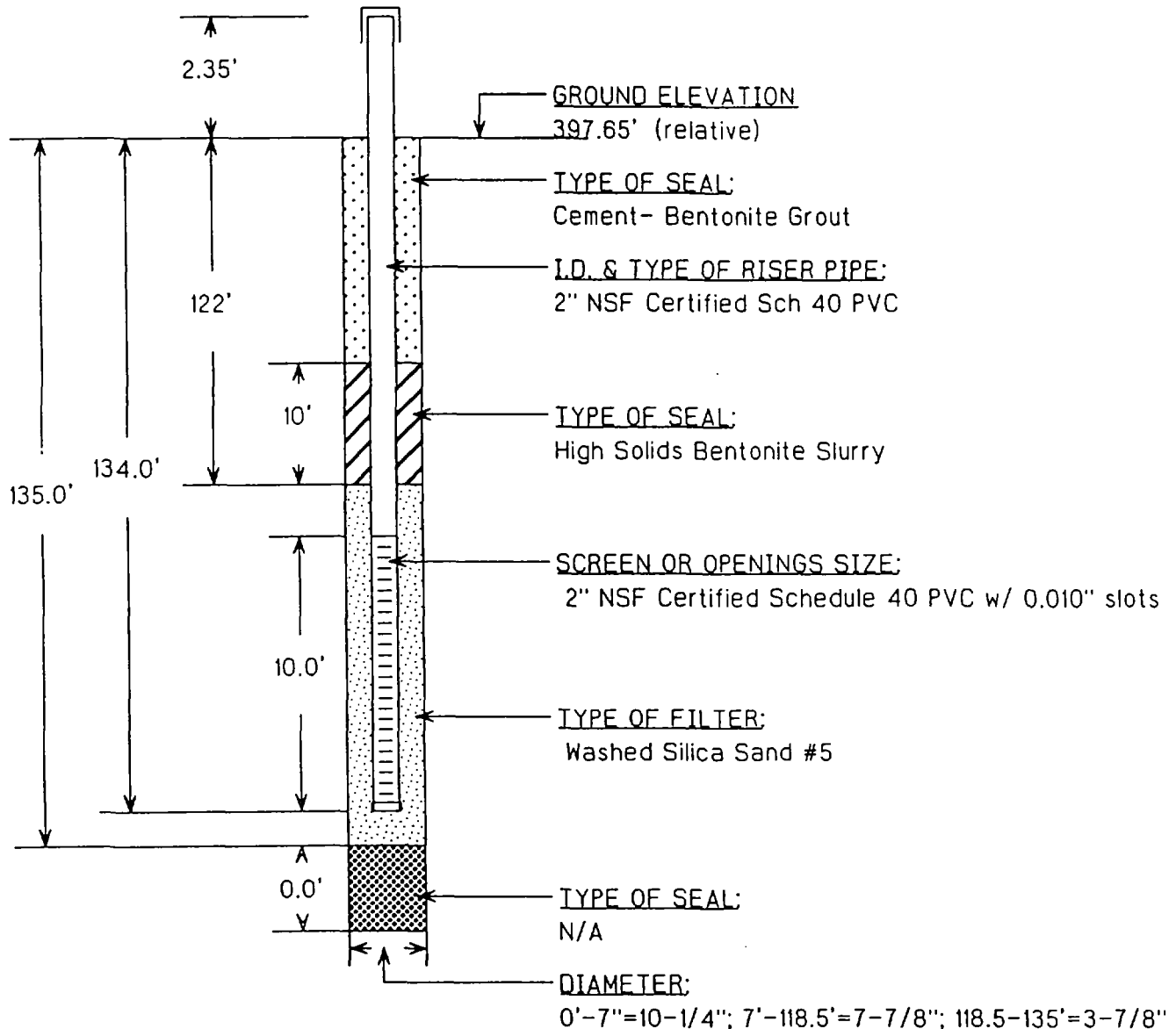
REMARKS:

Well pumped dry during development.

PIEZOMETER / WELL INSTALLATION LOG

NO. MW-9

CLIENT USEPA Region V		PROJECT Continental-Midland	PROJECT NO. 70720.143
PROJECT LOCATION Park Forest, Illinois	COORDINATES Not surveyed	TOP OF RISER ELEVATION (DATUM) 400.00' (relative)	DATE 8/30/93
STRATUM MONITORED Limestone		LOGGED BY J. Chitwood	
CHECKED BY R. Sutera		APPROVED BY J. Chitwood	



METHOD OF INSTALLATION:

Boring drilled to completion. Set riser pipe and screen. Placed filter and seal. Grouted to 2' below ground surface. Set above ground protective steel casing. Placed concrete surface seal to 6" above ground surface.

REMARKS:

55 gallons of water pumped from well during development.